Veterinary Medicine

VOL. XXII AUGUST, 1927 No. 8

Published Monthly by the Veterinary Magazine Corporation
4753 South Parkway, Chicago, Ill., U. S. A.
$4.00 a Year
Entered as second-class matter, July 19, 1910, at Chicago, Ill., under Act of Congress of March 3, 1873
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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

Kansas will have 24 modified accredited counties by August 1, 1927.

Iowa spent approximately $1,000,000 in tuberculosis eradication during 1926.

Nebraska has a law that becomes effective July 25th that will facilitate tuberculosis eradication.

Missouri has 947 tuberculosis free accredited herds of cattle and half that many herds under supervision.

Missouri has placed an order for one-half million leg bands for the accreditation of chickens against B. pullorum infection.

At least ten per cent. of calves of tubercular cows that are permitted to suckle their mothers, react positively to the tuberculin test within a year.

If calves from tubercular cows are removed immediately after calving, placed in clean quarters and fed milk from tuberculous free cows, they rarely ever are tubercular.

Although there may have been justification for the maintenance of a Bang herd some years ago, the present price of cattle does not justify such a herd in the United States.

Approximately one thousand veterinarians are now employed full time in tuberculosis eradication in the United States.

Baby chicks should not be fed until they are 72 hours old. A small amount of grit and sour milk should constitute the first feed.

A bull is good for several years service providing he is given ample exercise, liberally fed a proper ration and used intelligently.

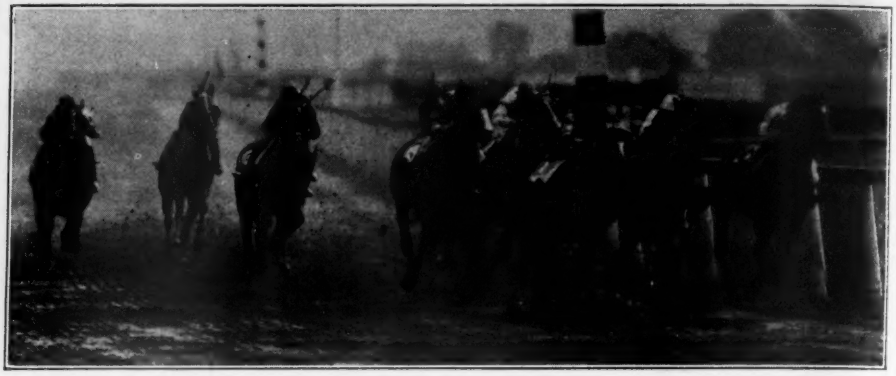
Proper sheltering of swine prevents heavy losses at farrowing time and the subsequent losses of small pigs from pneumonia and allied diseases.

Lambs should be docked and castrated when they are from one to two weeks of age, and they should be weaned when they are about four and one-half months of age.

Approximately $20,000,000 will be available for tuberculosis eradication for the next fiscal year in the United States. 80% of this amount will be used in paying indemnities.

Mastitis in milk goats should be given careful consideration because it has been found that the B. melitensis, the cause of undulant fever in man, is capable of producing mastitis in goats.

The average per capita consumption of meat, including lard, in the United States for 1926 was 156.3 pounds. This amount was composed of: Pork, 65.7; beef, 63.4; veal, 8.2; mutton and lamb, 5.5; lard, 13.5.



Betting on horse races was legalized in Illinois at the recent session of the state legislature.

Many aborting cows become immune or at least, cease aborting and produce calves, although they persist as positive reactors to the agglutination test. Is it advisable and economical to eliminate such cows from a herd?

2.35% of the cattle slaughtered under supervision were retained for tuberculosis in 1916. During the first nine months of the fiscal year closing July 1, 1927, only 1.01% were retained. This shows a marked reduction in the past eleven years.

That B. pullorum has a predilection for ovarian tissue of the hen is illustrated by the fact that these micro-organisms can be obtained from the ovary of hens that have been fed or inoculated with cultures of B. pullorum.

A combination vermifuge for the removal of round worms and tape worms has been devised by Ireland and Lamb. Each bird is treated individually by use of a syringe. The vermifuge recommended consists of oil of chenopodium, thymol, turpentine and cotton seed oil.—Ex. Sta. Rec. Vol. 56, p. 575.

It has been demonstrated that approximately 30 grams (one ounce) of water is eliminated hourly from the body by respiration and perspiration of an average woman and about 40 grams from an average man. The loss of water is approximately 50 per cent. in the exhaled air and 50% through the skin.

Throughout the period from 1825 to 1875 or 50 years, veterinary literature of England contains references to the extraordinary number of foals born dead in the year 1825 and of the number that died within a few days of birth. The cause of this loss of foals was not ascertained.

Carlisle Gelding, a famous English race horse of the first quarter of the 18th Century, commenced running at five years of age and continued on the turf for sixteen years, retiring in 1731. In that period he won 25 races and lost 9; running a total of 160 miles in the winning races and 68 miles in the races he lost. The distance run in a heat in those days was usually four miles.

Catherina began racing just 100 years after Carlisle Gelding retired and by 1841, had won 79 races and lost 98, running a total of 300 miles in the winning races and 283 in the losing races, or altogether 583 miles in public races. The heats had been shortened to two to two and one-half miles at this time although the old four-mile heat was occasionally run. Catherina usually carried a weight of 12 stone and on two occasions, 14 stone (196 lbs.).

STATE AGRICULTURAL JUL 21 '27

Use of Tracters In Part Responsible for Low Prices for Farm Products

IT IS generally agreed the immediate thing that is the matter with agriculture is a surplus of farm products. The recent congress was willing to expend 250 million dollars in an effort to eliminate this surplus from the domestic market. Earlier congresses having appropriated four times this amount for the reclamation of agricultural lands that were not needed are charged with a degree of responsibility in the creation of this calamitous surplus.

The following report of a survey made by the Ohio agricultural experiment station shows that the farmers themselves by replacing horses with tractors have unwittingly been responsible for destroying a very large market for their produce and thus the creation of the surplus. It is probably debatable whether a given amount of man power can produce more of agricultural products by the use of tractors or horses alone and as to whether the cost of such products will be reduced by the use of tractors. It has been demonstrated that the difference in results with either kind of power in quantity or cost of products is not very striking.

Certain it is that one type of power increases the consumption of nonagricultural products and the other increases the consumption of products of agriculture and this decreases the surplus of such products and that surplus be it remembered is what is the matter with agriculture now.

The preference for tractors over such power units as this is based more on the saving in the labor of grooming, harnessing, watering and feeding such a team than on any other real or fancied economy.

In Ohio alone one and one-fifth million acres of agricultural land have been released by the use of tractors for the production of surplus. If Ohio may be taken as typical for the whole country this means that agriculture has lost 10 per cent of its market as a result of the substitution of mechanical for horse power. A volume in

excess of the total present surplus that has near-ruined agriculture in large areas.

A further examination of the appended report reveals that the farmers themselves have been responsible for the destruction of more than five-eighths of this 10 per cent of their own market or an amount sufficient to account for the baneful surplus.

And this brings the problem right back to the farmers themselves and the agricultural associations, a source more likely to produce a solution than is congress.

A part of the horse effectives on the Hoffman Bros. ranch, Aberdeen, Saskatchewan. Where gasoline costs 45 cents a gallon the tractor is not so popular as it is in the States where it can be had at 15 to 20 cents a gallon.

LESS LAND AREA REQUIRED TO FEED OHIO HORSES

J. I. Falconer

One of the notable changes in Ohio farming since about 1910 has been the adoption of automobile and tractor power. This has led to a decrease of over 250,000 in the number of horses on Ohio farms, or nearly one horse per farm. While the substitution of mechanical power for horse power on the farm has greatly increased the productivity of farm labor it is also true that it has decreased the demand for farm products. For, while the horse is a farm-raised product, the tractor is a city-made product and runs on gasoline rather than grain and hay. Since, as it appears, horses formerly consumed approximately 25 per cent of the feed consumed by livestock on Ohio farms, the horse provided a market of considerable importance for our farm products. Their decreasing number may, in no small part, be responsible for the prevailing low prices for oats and hay. To what extent has this substitution released land formerly needed to raise and feed our horses?

Horses on Ohio Farms

1910	888,027
1920	810,692
1925	634,980
Decrease 1910–1925	253,047

The census shows a decrease of 253,047 in number of horses on Ohio farms from 1910 to 1925. Cost account data collected by the department of rural economics show that, on the average, a farm horse will consume 24 bushels of corn, 27 bushels of oats, and 3,850 pounds of hay per year. With our average crop yields, to grow these crops would take 0.6 acre of corn, 0.8 acre of oats, and 1.35 acres of hay. A total of 2.75 acres of crop land per horse. This acreage multiplied by 253,047, the decrease in number of farm horses, would give 695,880 acres as the land required to feed these horses.

The percentage decrease in number of horses in the cities, however, has been even greater than on the farms of the state.

Number of Horses in Ohio Cities

1910	188,041
1920	83,179
1926	58,000
Decrease 1910–1926	130,041

Since the horse in the city has no pasture and is fed more grain, it may be assumed that the acreage of crop land required would be one-fourth greater than that for the farm horse. This would make 3.45 acres per horse, or a total of 448,641 acres.

Furthermore, cost studies have shown that on 3 farms having tractors the horses are fed some 15 per cent less than those on farms having no tractor. There are about 30,000 Ohio farms having tractors. Assuming that these farms have an average of four horses it would normally require 11 acres of crop land to feed them. Allowing for the 15 per cent reduction would reduce this by 1.65 acres per farm or a total of 49,500 acres.

Total Crop Acres Released

By decrease in farm horses	695,880
By decrease in city horses	448,641
By less feed on tractor farms	49,500
Total	1,194,021

The change in Ohio has thus far meant a loss in the market for 1,194,021 acres of farm products. This is approximately 10 per cent of our total crop acreage. It would be sufficient acreage to feed 400,000 people.—*Bimonthly Bulletin* Ohio Experiment Station.

KANSAS STATE AGRICULTURAL COLLEGE JUL 21 '27 LIBRARY

The Feeding of Swine an Important Problem

By A. T. KINSLEY

THE importance of the proper feed and methods of feeding of swine in economic pork production and the occurrence of diseases can not be overestimated.

These are problems that vitally concern the breeder and feeder and are difficult to discuss execpting in generalities because of the fact that the food stuff that may be available on an Illinois farm for feeding of swine can not be profitably used on a farm in Florida, Montana or Arizona.

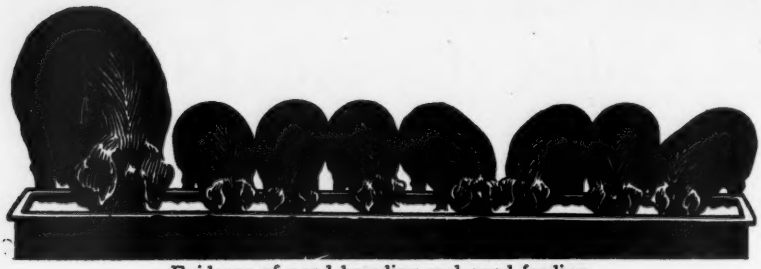
Diet depends upon the type of animal and its use. Mother's milk is the natural diet for the new-born. Sows differ in the quantity of milk produced, as well as the quality of same, similar to cows. It has been found that some sows produce from 5 to 7 lbs. of milk per day for a series of from 8 to 12 weeks. The analysis of sows' milk in a limited number of cases has shown that it contains approximately 7% of butterfat, 6% of casein and albumin, 5 to 6% of sugar and 1% of ash, or total solids of over 19%, thus sow's milk contains approximately 50% more total solids than cows' milk. From a few experiments it has been found that some sows rank favorably with good dairy cows in their ability to convert food stuffs into milk. The size of the fat globules is an important factor in the digestibility of butterfat or milk. Many orphaned pigs that are fed upon cows milk die of digestive derangement, because of the difference in the digestibility of sows' milk and cows' milk, due to the difference in size of the fat globules. A prepared milk approximating the composition of sows' milk may be made by the addition of cream, milk, sugar and lime water, and will be found quite useful as an additional food to sows' milk or to replace sows' milk in the case of orphaned pigs.

Keep Pigs Thrifty

The economical diet for pigs after weaning and until they are to be placed in the fattening pen or used for breeding, will vary according to location. The important factor is to maintain the pigs in a thrifty condition and favor the limit of development in size in a reasonable length of time. Pigs are developed most profitably in practically every section of the United States by pasturing. There are possibly certain exceptions at least according to the agricultural methods now in vogue in restricted areas such as the wheat growing district of Washington and some fruit areas in various states, in which it is claimed that it is more profitable to use the land for other than pasture purpose for swine.

Profitable to Feed Pigs on Pasture

It is profitable to feed small quantities of corn, barley or other foods to pigs that are on pasture because it favors growth and hastens development. The various types of forage for swine pastures vary in different locations. Alfalfa, clover, blue grass, peas, soy beans, rape and a variety of other grasses and forage are successfully used. The grain or concentrates for swine on pasture should be so selected that the ration supplied is best suited for growth and development. Corn and barley balance the ration for pigs on clover, alfalfa and other legumes. These concentrates can be varied in quantity if tankage and milk products are used. Generally speaking, tankage or some similar food are especially valuable and it will be found that pigs on pasture that have access to tankage rarely root,



Evidence of good breeding and good feeding

indicating the tankage is supplying some required ingredient in the food regimen.

According to some investigations, the diet should be slightly different for pigs that are going to be used for breeding and those for fattening, from the time of weaning. The breeding pig should be given about ½ lb. of protein or less per hundred pound live weight, and fattening pigs should be given 3/5 to 4/5 pound of protein per hundred pound live weight.

For breeding sows, a maintenance ration should be provided. Pasturing will be found economical for breeding sows and boars when not in service. Varying quantities of concentrates should be provided, using small amounts of grain until the later stages of pregnancy when the feeds should be changed so that there will be a limited amount of fat building elements and an extra quantity of nitrogenous and milk producing foods. The diet should be diminished a week or ten days prior to farrowing and for two or three days thereafter and then milk producing feeds should be provided in ample quantities for a sow can not produce milk unless she is liberally fed. Boars should receive a liberal quantity of concentrates during the breeding season and can be placed on a maintenance ration and preferably on pasture for the remainder of the year.

Fattening Swine

The economical ration for fattening swine consists of concentrates properly balanced. Many feeders believe that it is profitable to provide a small pasture at least in the beginning of the fattening period. Bulk foods such as may be obtained in pastures is of value in developing swine to stimulate an increase in the capacity of the digestive organs providing an excessive development and the production of the "pot belly" is avoided. Thus, green forage such as may be obtained in pastures, or the use of corn cob meal and peanut hulls are of value in fattening swine in the beginning of the feeding period, but are distinctly a disadvantage after the swine are on full feed. Hogs weighing from 175 to 225 pounds usually top the market and are therefore the most profitable market hogs. The heavy hog, that is those weighing 300 to 450 pounds require much more feed in proportion than 200-lb. hogs. It requires approximately 50 pounds of feed when properly balanced to make a 10-lb. gain in live weight on a pig weighing from 50 to 100 pounds. It is generally estimated that one bushel of corn produces 10 pounds of pork, but one bushel of corn and 150 pounds of milk will produce 16 pounds to 18 pounds of pork. Any feed is a benefit that will increase the consumption of grain and hasten early maturity, provided the cost of such product is not prohibitive. The quality of pork produced must be of first consideration in the production of pork. Swine grazing on peanut pasture or fed exclusively or largely on peanut meal may make fairly good gains but the pork is undesirable because it is oily and does not firm when the hogs are killed. Excessive quantities of rice bran also produces soft pork. A fair quality of pork has been obtained by feeding swine peanut meal in the beginning and finishing the last thirty days

with corn, or using not to exceed 11% of peanut meal during the entire feeding period. Rice bran can be successfully fed in the same manner as peanut meal.

Prepare Feed

Preparation of food stuff is important and is worthy of consideration by all concerned in the swine industry. The grinding of corn effects a saving sufficient to more than pay for the cost of grinding. Cooking is of no value for grain foods. It is of value in garbage feeds and it may possibly be profitable to cook such products as potatoes. The soaking of feeds is of little or no economical value. Possibly soaking may in some instances stimulate the appetite, but in more cases the soaking is not properly done and the foods are fermented and soured and thus result in more or less digestive disturbances. The method of feeding is also an important consideration in the production of swine. From various tests that have been conducted in practically all sections of the United States, there is no reason to doubt the efficacy of self-feeders. It should not be construed that self-feeders eliminate the necessity of labor; however, it does diminish the amount of labor necessary in caring for swine. The type of self-feeder selected will depend upon circumstances and upon the personal desire of the feeder.

The feeder and breeder that provides the most economical ration for the development of fattening of swine will be successful. The relation of quality and quantity of feeds to health are of primary consideration. The necessity of mineral supplements is now recognized. The preparation and methods of feeding are individual problems on each farm.

Readers of Veterinary Medicine are invited to comment on the foregoing discussion.

Although horses may be infected with trypanosoma from camels affected with surra and may harbor the parasite for some time, a relatively small percentage of such infected horses die of the malady.

ANIMAL LOSSES IN THE FLOODED AREA OF ARKANSAS

Fortunately, and contrary to all expectations, there has been as yet no wide spread outbreak of disease among farm animals in the flooded areas of Arkansas.

Some so-called mud fever or dermatitis followed by sloughing of the skin has occurred in horses and mules which stood in the muddy waters for several days, it appearing that pressure was as great a factor as infection in producing the condition. The treatment recommended before sloughing occurred consisted of the application of liniment, lead or zinc oxide. After sloughing, the application of antiseptic solutions and astringents were recommended. A few animals were lost from this condition.

Pneumonia was observed in horses, mules, and cattle that had stood in the muddy flood waters for several days with a subsequent loss of a large percentage of those affected.

A few cases of laminitis were observed and reported among horses and mules from the continuous standing in the overflowed sections.

While hog cholera was not prevalent in the inundated sections at the time of the flood, yet the removal of large numbers of susceptible hogs from open ranges in the bottom country and their concentration in camps resulted in outbreaks of hog cholera.

Speculation is rife regarding the probability of anthrax occurring in the flooded sections. Very few cases have occurred, but the season of year of greatest prevalence of the disease is just now approaching. However, the weather has been somewhat too cool for general outbreak of anthrax. Conditions may be such in the immediate future that this disease may appear more or less wide spread.

A few losses among cattle have been reported due to ingestion of large amount of sand deposited on pasture grasses, constipation or impaction being the prominent symptom. The condition was rem-

edied by giving the animals purgatives and removing from pastures until the rains washed the grass free of the soil.

Some losses among hogs in the overflow sections were observed and reported due to eating young cockle-burs.

It is surprising how few horses and mules were lost. It is estimated that about from six to nine thousand horses and mules were drowned. More cattle were lost than horses and mules for the reason that they were of less value and less effort was made to save them. It is estimated that from fifteen to twenty thousand cattle were drowned. The loss among hogs and poultry from drowning was greater, being about from fifty to sixty thousand hogs and from five hundred to five hundred and twenty thousand chickens.

Little Rock, Ark. J. H. BUX,
State Veterinarian

HOGS UNFAIRLY DOCKED FOR STAGGINESS

A lumber company in my territory had a bunch of hogs I castrated when they were six months old, and recently they sold the lot to a sausage maker, and he cut the price two cents a pound because they were not castrated when they were small pigs.

These hogs never had any service and what I wish to know is, if they would be classed as old boars on the market. These were October pigs.—R. B. M., Michigan.

Reply: If the hogs referred to in your letter were well fed and well developed, no doubt the buyer was justified in docking them a certain amount, but the 2c a pound seems out of reason.

The docking should have been for a certain number of pounds. That is, to offset the loss of weight in the shield, of the heavier head, sheath, etc.

Paying a lower price for boars is not ordinarily resorted to until they are staggy enough to render all their flesh of less value. Otherwise, they are docked from ten pounds to 50 pounds. I should imagine that a ten pound dock would have been sufficient in the hogs you mention.

If these hogs were sold through a live stock commission house, and your client is dissatisfied with the cut in price, the matter should be referred to the Secretary of Agriculture, Washington, D. C. The secretary exercises a supervision over live stock sales at the public markets through his licensing authority over brokers.

TREATMENT FOR NECROTIC ENTERITIS IN PIGS

May I have your opinion as to what is the latest, best and most complete method of treating or controlling necrotic enteritis in pigs? Has enteritis bacterin proven to be entirely satisfactory?—H. H., S. D.

Reply: Necrotic enteritis or pig typhoid is quite prevalent in various sections of the country. The malady exacts a heavy toll and is the most difficult disease of swine to control. The primary cause of necrotic enteritis is the B suipestifer, but insanitary surroundings and improper feed are important predisposing factors. The losses from necrotic enteritis can be reduced to a minimum by regulating the diet, providing reasonably sanitary surroundings, and the use of a specific bacterin prepared from the B. suipestifer. The best diet for this condition is a liquid or semi-liquid one containing a relatively limited amount of solids. It has been found that to render the feed alkaline by the use of caustic potash or lye and the use of some antiseptic in the feed may also be of value.

The bacterin prepared from the B. suipestifer has been found, experimentally, to increase the animals' resistance to the disease and is a valuable immunizing agent when used in swine that have been exposed to infection. In exposed herds, it is usually advisable to use two injections three or four days apart.—A. T. K.

Abortion disease in cattle according to Stuart effects 30 per cent of dairy and breeding cattle in Palestine. Melitensis infection in goats is relatively common and six cases of undulant fever in the human was traced to infected goat's milk.

NEBRASKA STATE AGRICULTURAL COLLEGE JUL 21 '27 LIBRARY

Veterinary Science in Japan*

By FRANK SCHOFIELD, Guelph, Ontario.

DURING THE summer of 1926 the writer, while travelling in Japan, visited both the Veterinary Department of the Imperial University and the Veterinary Laboratory of the Department of Agriculture, with the object of determining the nature of the work being carried on in these institutions. Due to the courtesy of those in charge much interesting information was obtained which, together with other relative facts, is presented in this paper.

Veterinary Education in Japan

At the period of the Restoration, 1868, veterinary science, along with the other sciences, was brought to Japan with the introduction of Western civilization. 1877 a veterinary department was created within the faculty of agriculture of the Tokyo Imperial University. To-day there are twenty educational institutions giving courses in veterinary science from which have graduated almost ten thousand veterinary surgeons. There is a marked difference in the academic status of these schools. The highest grade is represented by the veterinary departments of the Imperial Universities, of which there are two. Here veterinary science is considered as a special department in the faculty of agriculture. The regular course of study extends over a period of three academic years of seven months each. The entrance requirements for students are about equivalent to junior matriculation. The student enrollment is usually small, twenty to thirty men in all the years. The student fees are small, being less than $20.00 per term. The salaries of professors vary according to rank, a full time professor of a major subject receiving from $2,500 to $3,400. These institutions are financed directly from the Imperial Government. Satisfactory students have little difficulty in securing government positions after graduation. Of the remaining schools, fourteen are connected with agricultural colleges as divisions of these institutions. The entrance requirements are low, instruction is poor, with the result that graduates are not well equipped to undertake their work. As well as these, there exist three private veterinary schools, having a large attendance and being well staffed, but the entrance requirements are low so that the quality of the students is usually poor.

The super-abundance of veterinary schools and colleges has its explanation in the Russo-Japanese war of 1904. Fighting had not continued for long before it was discovered that the available veterinary surgeons in Japan were quite inadequate in numbers for the heavy work which had to be done. To protect itself against such a serious defect in the future the war department encouraged the formation of any kind of veterinary school. The regulations governing the establishment of schools were simplified and all graduates were granted a license to practise. This has resulted in much hardship among the better qualified men, so to-day a strong attempt to being made to abolish most of the schools which are below the standard of the Imperial Universities.

Achievements of the Veterinary Profession

Great credit must be given to the members of the profession in Japan for the courage and skill with which they have met many difficult situations. Western civilization came like a flood to Japan and with it western diseases. Many varieties of pure-bred stock were hurriedly being imported by the Japanese government, and with the stock came diseases such as contagious pleuro-pneumonia, rinderpest and other conditions previously unknown in Japan. To-day there is a well-trained force of inspectors controlling up-to-date animal quarantine stations at the chief ports. Contagi-

*From the Report of the Ontario Veterinary College for 1926.

ous pleuro-pneumonia has been eradicated by the drastic method of slaughter, and at the present time foot and mouth disease does not exist, while other epidemic diseases are at least being held in check. The difficulties in maintaining healthy herds of animals are unusually great, due to the proximity of Japan to China and Manchuria, where every kind of disease abounds unchecked. The progressive nature of the work undertaken by the government veterinarians is well reflected in the output of the veterinary laboratories. During the last year over four hundred litres of anthrax serum, nearly three hundred litres of hog cholera serum, and over fifty thousand doses of rabies vaccine were prepared. Besides these, tens of thousands of doses of other sera, vaccines, bacterins, filtrates and tuberculins were made. The director, Dr. Nitta, has made extensive experiments with the most promising prophylactics for tuberculosis, and is at present testing the value of an attenuated culture of his own. In the direction of research the work of Dr. Tokoshige on epizootic lymphangitis is well known in the West. Much work has been done and some interesting discoveries have been made in connection with diseases which seem to be strictly confined to Japan.

Animal Diseases in Japan

All of the epidemic diseases common to the West are known in Japan. They have either been imported directly from Europe by the introduction of pure-bred stock or have come via the Asiatic mainland. Possibly the most serious is rinderpest, which is constantly creeping in from China. Blackleg, anthrax and hog cholera are fairly common. It is of interest to note that at least one-third of the cases of anthrax occur in horses. Rabies has decreased in a remarkable degree since the extensive use of the prophylactic vaccine. The commonest disease of the horse is strangles, for which both a vaccine and a serum is used extensively. Epizootic lymphangitis, which at one time was very common among the horses of Japan, has been almost entirely eradicated. A most serious condition in dogs is caused by a parasitic nematode, which lives in the heart and large blood vessels, the *"Filaria immitis."* The parasite is transmitted by the mosquito and it is estimated that 85 per cent. of the dog population suffers from infestation.

Among dairy cattle, tuberculosis causes severe losses. The earliest tests which were made in 1900 revealed the fact that 34 per cent. of these animals were infected. Twenty-three years later the percentage had been reduced to 10.2 per cent. Tuberculosis is still a rare condition among the native animals, which live singly, and almost always in the open. They are not used for milk production, but share almost equally with the horse the heavy draft work of the country. Milk fever is quite common among the imported dairy cattle. Mange in all animals and of all varieties is frequently encountered. Parasitic diseases of sheep became so serious that the industry failed soon after its inception.

Veterinary Practice

The profession of veterinary surgery and medicine is hardly to be coveted in Japan to-day. There are a few men with large city practices, but the majority are just able to make a living and nothing more. A large number of the graduates of the inferior schools carry on their veterinary practice as an accessory, making their living from some more regular and lucrative form of business. The fees are very low even when compared with the cost of living. A visit in the city will be made for fifty cents, while a trip to the country will only realize from $1.00 to $1.50. The usual fee for a major operation, such as neurectomy, is $5.00. There can be no improvement under the existing system of veterinary education. A bill which will result in the elimination of the inferior schools and colleges has already reached the Japanese Diet.

Live Stock in Japan

Although Japan has a population of fifty-six millions of people, her animal population is less than 10 per cent. of that of Canada. The work of the veterinarian is therefore limited by the comparatively few animals owned by the farmers. Labor is cheap, to the court and its supervision was placed

the families are large and so most of the work is done by the peasants themselves. Another important factor is the small size of the farms. Fifty per cent. of the farms have an area of less than two and a half acres, which can be easily cultivated by manual labor. It is interesting to notice that there are more horned cattle used in farm work than horses.

Until recent years stock breeding has not prospered in Japan and chiefly for religious reasons. With the advent of Buddhism, strict edicts were promulgated against the slaughter of any animal. As early as 741 A.D. anyone killing a horse or an ox was flogged with one hundred strokes and heavily fined. For a while the important industry of fishing was ruined and the state had to provide rice for the fishermen who were not allowed any longer to catch and kill fish. Apart from religious reasons the use of flesh for food is very limited in Japan, also their customs do not require the important by-products of leather, hides, and bristles.

Live Stock Breeding

The native horses of Japan are of poor quality, as little attention had been paid to breeding. The experience of the Japanese Government with their remounts during the Boxer War was very unfortunate. Their horses were not only of poor quality, but frequently so vicious that their management became a dangerous and difficult problem. Few of the horses had been castrated. Immediately following the war a law was enacted encouraging castration, which is done free, and offering a small grant of money if the animal should be disabled or die as a result of the operation. In addition to this a Horse Bureau was established with an endowment of $15,000,000 for the purpose of improving the native stock and to provide funds for importation. Thousands of foreign stallions have been imported and about 1,500 are kept constantly for service. Horse racing was encouraged and became very popular.

There are no native breeds of sheep in Japan, so to provide the wool required with the adoption of Western civilization a large number of sheep were imported in the early eighties. The introduction of sheep was a costly failure as most of the animals died. At the time it was thought to be due to eating a coarse bamboo grass. Later investigation considers the loss to have been due to parasites, especially the *"Oesophagostoma columbiana."* During the last war Japan encountered such difficulties in procuring wool that a further attempt at sheep raising was made. A special bill was passed by the parliament authorizing the purchase of 1,000 head of sheep from abroad each year. A small subsidy of $2.50 per head is granted to any farmer who raises sheep.

S. Kondo of the Veterinary Laboratory, Ministry of Agriculture, Nishigahara, Tokyo, Japan. Doctor Kondo has been actively engaged for 10 years in investigations into the control of rabies in dogs. He has traveled and studied in America and in 1924 read a paper on Antirabic Rabic Vaccination in Animals, at a meeting of the Hudson Valley Veterinary Medical Association at Pearl River, New York. This paper was published in the November, 1924, issue of Veterinary Medicine.

Most important, however, is the veterinary supervision of these sheep for the purpose of combating the parasites which caused the failure of the early experiments. At present all sick sheep are treated at government expense. The total number of sheep is about 10,000.

The native cattle were used almost exclusively as beasts of burden. As long ago as 645 A.D., a milk cow was presented to the court of Japan and from that time on milk was looked upon as a peculiarly valuable food. A century later a dairy herd was attached

in the hands of the court physician. Butter was also made for the use of the courtiers. The dairy cattle of modern Japan are all of foreign importation. Holsteins and Ayrshires have so far proved to be most suitable for the climate. Milk cows number 50,272 and the average yield is about 3,500 lbs. per head per year. Dairying is really a new industry and at present dairy products are very limited. Most of the milk is used in the fresh state. Pasteurization is required of all milk offered for sale. The price is rather high, varying from twenty to twenty-five cents per pint.

Poultry

While birds are seen around most farm houses, poultry has not as yet attained any particular development. The egg production is very low, the average being seventy eggs per bird per year. The value of a bird for table purposes is about seventy-five cents. Far more valuable are the birds raised for fighting purposes, which sport still continues in secret. A good fighting cock will easily fetch as much as $50.00.

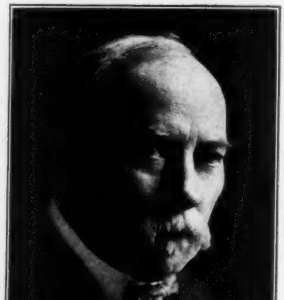
Dogs and Cats

These animals abound, but do not hold the affection of the people to-day as in ancient times. A thousand years ago among the wealthy there was a rage for keeping dogs and cats. They received human names and titles and, when they died, elaborate funerals. Kittens born were treated with the same care as was bestowed upon an infant emperor. Beautiful presents were sent to the cat mother, and ladies-in-waiting were appointed to the kittens. At a later date dogs were kept for the purpose of fighting and twelve days were set apart each month to witness the performance. These fads have long since vanished and to-day these animals receive even less attention than in the West.

The remarkable development of the animal industry during the last half century and the present keen interest on the part of both government and people in stock raising, augurs well for the future of the veterinary profession. There, as here, the factor of motor power taking the place of horse power must be considered, yet for years to come its influence will not be felt to any extent.

COWBANE AND OTHER WEEDS

Dr. J. A. Brill of Dow City, Iowa, writes as follows: "I am sending you under separate cover sample of weeds found in pasture which have in the past caused poisoning of horses. Will you kindly differentiate these specimens and also let me know if there are any poisonous weeds in the collection, and if so kindly send me back sample?"



Prof. L. H. Pammel

The plants sent consist of several specimens, which are known to be poisonous and injurious. The list of plants is as follows: mayweed, *Anthemis cotula,* which is more or less injurious, containing several active principals; knot weed, *Polygonum erectum,* not known to be poisonous; swamp milkweed, *Ascelpias incarnata,* probably injurious like the larger milkweed; blue vervain, *Verbena hastata,* not poisonous; the common willow, *Salix,* not poisonous; catnip, *Nepeta cataria,* which s slightly injurious; the buttercup or crowfoot, *Ranunculus septentrionalis,* which is more or less acrid, though not strongly poisonous; marsh cress, *Cardimine rhomboidea,* not poisonous; and last, the extremely toxic plant, cowbane, *Cicuta maculata,* with fleshy tuberous roots and compound leaves. It has a strong odor, contains a toxin, cicutoxin. This plant is especially poisonous in the spring and early fall. The animals have convulsions and if enough is taken, and the quantity need not be large, death follows. Now it may be that they did not consume very much of this weed, though I think some of the poisoning that you speak of may have been caused by eating a small quantity of the leaves of this plant.

Ames, Iowa. L. H. Pammel.

Ask Me Another

By J. F. DE VINE, Goshen, N. Y.

QUESTION: While talking with some veterinarians recently we were discussing a statement you are credited with relative to the diagnosis of pregnancy during the early period. One veterinarian said you have stated you can usually diagnose the date of conception within three or four days, in the case of pregnancy of six to twelve weeks' duration. Will you be good enough to outline how it may be done.—E. J. M., Georgia.

Reply: Yes, I have made such a statement and thought I verified its accuracy at the A. V. M. A. meeting held at Montreal when my diagnosis was within three days of the date of service which the owner handed in a sealed envelope to the chairman of the Clinic Committee. If interested, I could give you the names of veterinarians with whom I have worked in herds where we have corrected the breeding records after examining an animal, stating that the animal was pregnant for such a period rather than the date given by the attendant, and often found by going into detail or looking up records that the animal had been bred several weeks prior to the record or several weeks later, sometimes of course without the knowledge of the owner, or herdsman in charge of the herd at this particular time.

I have been repeatedly asked, since publishing such statements, how such a diagnosis may be made, all of which is answered the best I know how in my article, Diagnosis of Pregnancy, published in Veterinary Medicine, September 1920, page 433, (Vol. XV, No. 9). I attempted to set forth there upon what we can base our conclusions in most cases.

In answer to this, some veterinarians have stated to me that fetuses vary so in size that they would think this variation would be misleading. My answer to this is that fetuses up to twelve weeks, do not vary in size as much as does the knowledge or rather the lack of knowledge of the one making the diagnosis. I have compared my diagnosis with the breeding records of hundreds and hundreds of animals that were regarded as regular breeders and I have found the size of the fetus as constant as most things we have to do with. If you run on an unusual case, leave it alone and give it time enough to develop more definitely, in other words, never try to be too smart and too cocksure. Time will usually help you out. It is true that fetuses do vary slightly, but you must take that into account in making diagnoses. Small breeds and small animals will have small generative organs and the fetuses will be somewhat smaller, but when they vary materially it will be so unusual as to be noticeable, and usually when a uterus in the early weeks of pregnancy is smaller than it should be to agree with the date of breeding we will find on going into the case carefully that the animal was bred at a later period, and we must be very cautious not to do any injury to the ovaries or be too severe in our manipulation, unless there are pathological lesions or other proof that the animal could not be pregnant. It is well to keep in mind also that we do not hope to be one hundred per cent. accurate in this work any more than we do with other things where Nature governs, but it is of tremendous advantage to be accurate in the majority of cases. It is true that fetuses vary more during the latter part of pregnancy than they do in the early weeks, and your diagnosis in those cases as to the age of the fetus is only relative, but even then if they vary materially from accurate records an experienced person can state that there is something irregular in this case.

I recently had a striking illustration of

this in my own herd. A three year old purebred Jersey heifer, after being bred five months, was noticed by the caretaker to be in heat. She went down on her milk and did not act well or regain her normal condition for nearly three weeks. When it was brought to my attention (I being absent during most of the interim) I examined her after a week or so. She should then, according to our records, have been six months with calf, but the uterus was not in the location it should have been at six months' pregnancy, and still it was sufficiently out of reach so that one could not fully outline the uterus or the calf. The artery indicated pregnancy and life, and still there was something wrong. If the heifer had belonged to some one else, I would of course have advised letting her go three months more, and in case the fetus had died, mummification (since the cervix was perfectly sealed), should then be so pronounced as to be diagnosible or full term pregnancy would be evident. But being my own animal, and costing no one else anything, I slaughtered her for information and found on autopsy exactly what we found by examination, that is, we had a live fetus but one too small for the period of pregnancy and consequently of a lighter specific gravity than it should have been, all of which emphasizes the fact that by careful study we can become so accustomed to the size and location of the uterus that even a slight variation in size at the age of six months is noticeable.

It seems unnecessary to explain to veterinarians or any professional man, that the only way to gain knowledge as to the approximate age of a fetus is through actual practice. I don't believe that any human being can put on paper how to make such a diagnosis—I am sure I can't —but there is something about the size, feel and density of the pregnant horn, its comparison with the size of the empty horn, the amount of fluid, etc., all of which make up a complex to which the fingers become accustomed. Naturally, when I first began trying to make diagnoses of the duration of pregnancy I had to rely upon the other fellow's records, then after a time I began doubting the accuracy of the records of some cases. For years I did a lot of tuberculosis testing and autopsy work and I was very careful to get the breeding records when I could, and on the killing floor I studied the fetuses and compared the majority and I could very plainly see that there was a difference in the size of the uterus, amount of fluid, and thinness or thickness of the wall that varied very distinctly when comparing two uteruses where conception had taken place even a few days apart. There is nothing unusual or phenomenal about making such a diagnosis at all. It is simply a case of taking the interest to practice enough. There is no mathematical precision about it, no weights or measurements, any more than there are in some other things we cannot explain, that are apparent to our senses. For instance, we go into a show ring and see two saddle horses about the same size, nice fronts, fine short backs, good legs and feet, comfortable action, splendid manners, and still we make a decision as to which one we like better very quickly and positively. Not so easy to write it down or tell the other fellow how you did it, but as with people, there is an indefinable personality that is evident at once. We see two brothers or two sisters. There is eighteen months' difference in their ages. Usually it is so apparent that any stranger can detect it, but it might be no easy matter to tell why. It may not be size at all.

I repeat I have already tried to explain this in my article on the Diagnosis of Pregnancy, and when the question is brought up I have frequently asked a veterinarian if he has read the article. Some are frank enough to say No, they were not interested in the diagnosis of pregnancy when the article was published. Others will tell me they have read it, which is pretty good proof that it did not "take root," if they did read it, and so I

am asking the editor of Veterinary Medicine to republish the article.

Diagnosis of Pregnancy*

In my previous articles I emphasized the necessity of diagnosing and differentiating pregnancy, particularly early pregnancy, from pathological conditions of the uterus that might simulate pregnancy; in other words, the differentiation of pregnancy, so as to avoid the killing of the delicate embryo by severe manipulation of the horn or horns; or the equally certain death and expulsion of the fetus by pressing out of the ovary a true corpus luteum, or the corpus luteum of pregnancy.

I confess that I do not know how to sufficiently emphasize this danger, as it seems to be one of the most common and constant errors of inexperienced operators, and I doubt if there is any other thing that so enrages an owner as to have a veterinarian abort an animal that the owner has been sufficiently anxious about to consult an expert to determine if possible why the cow has not bred more promptly or why she is not showing regular periods of estrum. I have repeatedly cautioned against the unreliability of any breeding history that may be presented to us. It matters not how accurate the records are supposed to be kept, or how certain the attendant is as to his information we must not let this mislead us. The information we gain from examination must be our guidance and other information simply accessory. This is not only true in diagnosing early pregnancy, but it is well to keep in mind that ordinarily it is much easier to diagnose a six weeks' than a six months' pregnancy. To show how misleading records may be, I will cite the following case: On April 24, 1918, I examined a purebred Guernsey cow, the breeding record showing that she was due to calve March 8, 1918, and that about Feb. 1, 1918, she had been ill with a very high temperature and had been attended by a thoroughly capable veterinarian, whose whole life had been spent among cattle. The owner and herdsman reported that both the veterinarian and herdsman had at that time palpitated the calf in the right flank very plainly. They were fearful at the time that the cow would lose her calf, owing to the high temperature she carried. However, she recovered without aborting and according to their figures was six weeks overdue at the time I examined her. I pronounced the cow carrying a calf around six months of pregnancy. This the owner and herdsman were quite positive could not be true for two reasons

Fig. 1. When a cow arches her back, the organs cannot be successfully examined, but by pressing upon the dorsal spines with a hard blunt instrument like a closed pocket-knife, the back goes down and the organs fall into their normal position, where they can be systematically explored.

First, the bulls and cows were kept absolutely apart in distinct buildings and the herdsman directed all breeding, and he was certain that the cow could not have been served without his knowledge and direction. Secondly, the veterinarian and herdsman both had palpated at least an eight months' calf in February.

The error of their records is still unsolved; nevertheless the cow dropped a calf on July 30, 1918, three months and six days after the day I examined her.

It is not an easy matter to give instructions for the diagnosis of early pregnancy, still there are certain things that aid us materially, and when combined,

* Reprinted from the September, 1920, issue of Veterinary Medicine.

make a diagnosis about as accurate as it is humanly possible to secure.

The history will usually be of some value, particularly where an animal has been a regular breeder and has passed one or more periods of estrum, but when it is desired by those in charge, as is so often the case at the present time, in large herds, that the animals be examined to determine definitely whether or not they are pregnant, so that there will be no delay in giving the necessary attention to have them breed at the desirable time, the passing of an estrual period is of little value in the diagnosis.

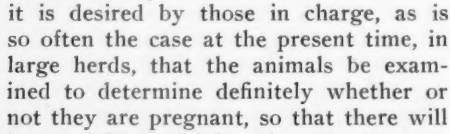


Fig. 2. And if the organs are carefully handled, there is not much resistance offered thereafter, even when the ovaries, and the cornua are drawn back into the pelvic cavity, for further manipulation.

It is common knowledge that ordinarily when an animal conceives, she ceases to have periods of estrum, but this is not always the case; we not infrequently see cows take the service of the bull at regular or irregular intervals, during a part or the whole of the period of pregnancy; consequently this weakens the reliability of the cessation of estrum. Conversely, animals that are not pregnant, ordinarily have regular or irregular periods of estrum, but again, very often a corpus luteum fails to be absorbed between the estrual periods and such will cause a cessation of estrum for an indefinite period, just as certainly as a true corpus luteum of pregnancy; therefore from the minute we enter the vagina, until we have carefully examined the cervix, horns and ovaries, it is well to proceed with the most delicate touch and careful manipulation.

How Early Can Pregnancy Be Diagnosed?

The question is frequently asked, how early can pregnancy be diagnosed? I can best answer that by stating that in herds where I make regular examinations to verify the records and to determine if the animals are breeding, unless there is some particular reason, I prefer not to examine an animal for pregnancy, until at least five, and preferably six weeks after it has been bred. I will admit that where the organs are ideally normal and if upon examination the cervix be found closed tightly and the vagina sticky, particularly near the cervix, and there is found a distinct asymetry of the two horns, but not asymetry enough to give any definite information by palpation of the horns alone, and if in addition a distinct corpus luteum be found standing out on the ovary, corresponding to the enlarged horn, and the history is that the animal was bred four weeks previous, one would doubtless be justified in stating that she was four weeks' pregnant, but this is an ideal coordination.

But, on the other hand, in examining an animal that has been bred four weeks, one may find a cervix that in no way indicates the formation of a seal, even though the animal be pregnant. One may also find in a middle-aged cow that has been bred several times, two horns similar as to size, particularly if she is this time pregnant in the left horn when her previous pregnancies have all been in the right horn; or if there is a slight asymetry of the horn, one may fail to outline a distinct corpus luteum in that ovary, even though she be pregnant; with the result that one finds one's self face to face with the proposition that it is either a pregnant horn or a horn slightly catharrhal.

If the ovary is enlarged and one is in doubt whether it is a true corpus luteum or a cystic degenerated corpus luteum, there is no way to determine except by putting sufficient pressure on the ovary to remove the corpus luteum of pregnancy if there be one, or to crush the deep-seated cyst or cystic corpus luteum, if that be the case.

The natural and safe thing to do is to leave the ovary and horn alone, for at least two weeks longer. The result of such an examination is unsatisfactory both for the veterinarian and others, which is the reason why I stated above, that unless there is some particular reason I prefer not to attempt to diagnose pregnancy under six weeks.

On the other hand, it is my belief, that six weeks' pregnancy is practically one hundred per cent diagnosable. When the rectum has been emptied, the cervix is grasped with one hand and drawn gently back, and with the other hand in the rectum on the floor of the pelvic cavity or just anterior to it, the uterine horns will be found. The bulk of the fetus and its liquids, and the thinness of the uterine horns at this early period are really quite astonishing. It already has assumed the feeling of an intestinal horn filled with liquid, and in those uteri in which the horn enlarges in circumference rather than in length, it is just about the size that man's hand can cover nicely; thin and fluctuating.

Occasionally one finds a uterus in which the enlargement seems to affect the entire horn rather than the middle part. In these cases the fluctuation and pronounced thinness of the horn, is not so noticeable, and it is well to follow the enlarged horn to its end and gently locate the corpus luteum of the ovary, or an enlarged ovary indicating a corpus luteum is found.

After one has palpated a few horns of this type, they are usually as readily diagnosable as one in which the fetus and fluids are more circumscribed.

Changes Easily Noted

From six weeks on there is such a daily increase in the size of the pregnant horn that it is almost perceptible from day to day, so much so, that after one has had considerable experience in examining pregnant uteri, one can often be of service

Fig. 3. DeVine illustrating his method of examining the uterus at the time of the A. V. M. A. meeting at Columbus.

in straightening out the breeding records of a herd, it being possible usually in from six to twelve weeks, to determine the age of a fetus to within at least three or four days. After twelve weeks the uterus begins to draw ahead gradually and while one can plainly palpate the top and sides of it, still ordinarily one cannot raise it in the hand and get the full outline so as to estimate the size, as can be done earlier. It is well always to locate the non-pregnant horn, in very early pregnancy if at all in doubt, and it will be found somewhat like a small appendage growing out from the pregnant horn; and if still in doubt as to the diagnosis, the cervix may be drawn back and examined more closely to determine if a seal is forming. If a seal is plainly visible, it is of course a very good indication of pregnancy, which is also true in cases where the seal is not visible, if particles of the seal adhere to a small catheter passed part way into the cervix; but again a substance closely resembling a seal is occasionally found in the cervical canal of a non-pregnant animal, or unfortunately any evidence what-

soever of a seal may be quite wanting in a pregnant animal. However, all of this confusing examination is unnecessary to the experienced operator, if the animal is six weeks' pregnant. In twin pregnancy, naturally, there is not the asymetry of horn, but there is the same fluctuating enlargement with the thin firmness of the horn walls to differentiate it from catarrh of the uterus, and the thin smooth feeling, with the quick moving liquid, to differentiate it from a uterus suffering from pyometra, with a denser feeling and a slow moving liquid, which we will discuss later.

From the third month on there is naturally considerable change in size and form of the uterus, to accommodate the volume and position of the fetus and its membranes. The walls become tenser, the fetal fluids are quite easily recognized and from about the third month on, the cotyledons may be palpated, and at the fifth month it is sometimes possible to palpate the fetus floating in the fluid, becoming more and more recognizable until about the sixth month, when the fetus may rather suddenly drop to the floor of the abdomen and be entirely out of reach, until around the eighth month but one is always justified in suspecting advanced pregnancy when on entering the vagina the cervix is found pulled well forward. These suspicions are further substantiated even if one cannot locate the uterus, but finds the fundus drawn as a flattened band over the anterior border of the pubis. At this period of pregnancy much reliability may be placed on the enlargement of the middle uterine artery, which is usually enlarged to one-half inch in diameter and the throbbing is plainly felt through the rectal wall.

It is true that a growth in the uterus might be of sufficient weight to draw it down, as does the fetus, but in such cases the absence of the enlargement of the uterine artery and other obtainable information, such as the last breeding date, may be of assistance is the diagnosis.

Fortunately from the sixth to the ninth month there are certain changes in the size of the abdomen and the position of the fetus, which enables one usually to get rather definite information as to the approximate age of the fetus.

When the fetus acquires sufficient weight to pull it downward and forward on the abdominal floor, the anterior extremity of the gravid uterus lies close to the diaphragm. The weight of the fetus and the horizontal position of its body tends to keep it in an anteroposterior position. By the arrangement of the circulation, the anterior portion of the fetus in early life receives more arterial blood than the posterior, which causes the anterior portion from greater weight, to rest downward and toward the fundus, rather than toward the conical extremity of the horn, but later, when the hinder parts become more developed, they exceed in weight the anterior part of the body. By this time the uterus is lying upon the abdominal floor and naturally the posterior part occupies the lowest point, with the head still pointing toward the fundus, and owing to the size of the fetus and the shape of the horn, the fetus has a fixed position, hence the greater majority of presentations are anterior.

The position of the fetus also explains why when attempting to locate, say a seven months' fetus, by ballottement, it may be necessary to reach quite under the abdomen; while as pregnancy advances it becomes much simpler to locate the fetus in the right flank, there being a gradual advancement backward and upward toward the pelvis, until near the end of pregnancy, when the anterior extremity of the fetus approaches the inlet of the pelvis; consequently when once the fetus can be located by ballottement, one can again get fairly accurate information as to about the period of gestation, from the location of the fetus from the outside, which of course may be confirmed by rectal examination if desirable.

Feeding Poultry in the Breeding Pen to Produce Strong Disease Resistant Chicks

By F. D. PATTERSON, JR., Auburn, Ala.
Department of Veterinary Medicine, Alabama Polytechnic Institute

IF WE are to produce chicks which are strong and disease resistant, the utmost care must be given to feeding the parent stock. Careful feeding must not be confused with pampered or complicated feeding, but is merely feeding along lines of common sense. In feeding poultry we must first consider nature's methods. Our birds in the native state got their food by foraging, which consisted of grass and weed seed principally, together with green feed of various kinds, and worms and bugs, the latter furnishing them with the animal protein necessary for health and production; and we find that they do not produce in nature unless this animal protein is available, which is in the spring and summer months. Green food is also available at these seasons, which is vital in production and in keeping birds in a healthy state.

In feeding domestic poultry we must follow these natural feeding principles as closely as the changes incident to domestication will permit. We must remember that the present day hen is a very productive machine and produces in seasons not in keeping with their native environment. Therefore, we are forced to deviate from nature's principles sufficiently to take care of this change, yet remembering that if we deviate too far, as is often the case, we must pay the penalty nature imposes on us for disobeying her laws.

If we are to get fall and winter production, we must supply the animal protein required; also, green food. In supplying the animal protein the breeder so often goes wrong by overdoing the feeding of this essential article; they try to force them too much and reap, as a result, many prematurely, worn-out, over-worked and diseased breeding birds, and a crop of weak chicks which fall easy prey to any disease that may come their way. In our experience, a majority of the diseased conditions we are called upon to handle are directly or indirectly due to forcing the birds too much on heavy protein mashes and feeding them insufficient green food. In such conditions, of course, the principal measure taken is the correction of these errors and often that is all that is necessary to prevent and control the trouble.

The first essential then, in feeding breeding stock is to avoid forcing them on these heavy protein mashes, and see to it that green food is abundantly supplied, for birds in the breeding pens should never be forced fed, but fed in such a manner as to produce eggs in sufficient numbers without undermining their health, fed to produce in a healthy, normal manner, preserving and inducing health and vigor rather than lowering vitality.

We may be justified in forcing birds which are strictly used for commercial egg production, but there is no justification for forcing breeders, for we are not only undermining the health of the mature breeding birds, but we are also paving the way for much trouble in the next generation, and if this method of feeding is kept up, we will find each generation becoming less disease resistant.

A poultryman takes much risk if he forces his commercial layers as much as is usually practiced on the average egg farm, for far too frequently and too high a percentage of his producers become worn, and burned out long before the season is over, often causing a total decrease in production and profit rather than an increase, though a few individuals may be able to come through with phenomenal records. We have recognized the seriousness of this force-feeding for production in dairy practice, so why not

recognize it in our poultry practice when the history, clinical symptoms and lesions so closely resemble those found in cattle feed upon similar lines. Some of our state experiment stations are already beginning to recognize this and are modifying their feeding accordingly, and it won't be long before the rest will be forced to follow suit. We, as veterinarians, should take the lead in this, one of the most important features in the preservation of poultry health.

We expect to take up in a future article the various pathological conditions that are directly traceable to this type of feeding.

In outlining a proper feeding schedule. we are only trying to give the fundamentals of the proper feeding scheme for breeding stock, for there are so many different feeding schedules, many good and many bad, that it would be impossible to take them all up here. So we will take up one which will illustrate the point and is one (or at least very similar to a schedule) that has given us excellent results. We must also remember that there is no set rule for feeding poultry as we must be governed to some extent by the feeds we have at hand and be able to so arrange them that we will have a suitable ration by bringing in a minimum of outside feeds; besides we must remember that no matter how excellent our feeding may be, it, at times, will need some change, and the wise feeder detects this need and acts accordingly.

The principles to be followed are: 1. Mash; 2, Grain; 3. Green food; 4. Grit, oyster shells and charcoal; 5. Water. The mash is the important part, so far as forcing is concerned. Most commercial mash feeds contain from 18 to 22 per cent of animal protein, and besides the feeder often forces them to eat an excess of mash by reducing grain, and frequently they are fed too little green food. The above method gives the birds entirely too much protein elements and too little of the other essentials. So no wonder we produce weak, sickly chicks and so often lose so many good breeding birds prematurely. A suitable mash hinges around the animal protein or some of its substitutes, and to my mind such elements should never constitute more than 10, or at most 12, per cent of the mash feed fed to breeding birds. And besides, they should be fed on plenty of grain and green food. Remember, the higher the percentage of animal protein, the more important it becomes to see to it that plenty of grain is fed. Remember also, that birds can stand more high feeding when unlimited green food is fed than otherwise, for the grain and green food causes the bird to eat less mash and the green food especially, keeps the birds in a healthy state, so that they are more resistant to errors in feeding. A mash similar to the following has been very satisfactory to us:

Wheat bran	30 lbs.
Wheat shorts	30 lbs.
Yellow corn meal	30 lbs.
Commercial meat scraps or cotton seed meal	10 lbs.
Table salt (NaCl)	1 lb.

When alfalfa and ground oats can be had on an economical basis, they can be worked in the mash to marked advantage, as the greater the variety the more efficient the feed. Also, bear in mind that high grade meat scraps of a high protein content should be used.

In this section we find it hard to get breeders to mix their own mash, so to get around the excessive high protein feeds found in commercial mashes, they are advised to dilute the mash by using equal parts of wheat bran. Many diseased flocks have been handled successfully by merely diluting in that way the mash fed. Feed mash in hoppers which should be constantly before the birds.

The next item to consider is grain. A good grain mixture can be made by mixing equal parts of yellow corn, wheat and oats, or by using a reliable commercial scratch grain. The birds should be fed grain so that they will consume at least 1 pound of grain for each pound of mash. All grain food should be fed in deep litter, especially when birds are confined to yards as this gives them the necessary exercise that the native fowl gets by having to forage for their living. All grain and mash feeds

should be clean, sound, free drom dust or molds, and of a high grade product.

Third, comes green feed, and this is where we so often find trouble. Green food can very aptly be called the great balance wheel in poultry feeding, for it overcomes so many defects in rationing poultry. Birds fed sufficient green food are more resistant to any disease than those that have an insufficient amount. It supplies many necessary vitamins and other essential elements for production of healthy stock. Nothing can take its place and no ration is complete or even of much value that does not contain it in some form. Many deficiency diseases are prevented and overcome by feeding it. Green food should be fresh, succulent and grown in the direct rays of the sun, and is best supplied by planting some good green cover crop in the yards, thus allowing the birds to harvest their own green food as far as possible. Rape, oats, rye, and leafy vegetables are ideal. Few southern winters are severe enough to prevent rye and rape being grown in the open. In more severe climates other steps must be taken to supply it. One of the best is the feeding of sprouted oats, and even in this section, this feed has a prominent place. But always insist on sprouts that have been exposed to the direct sun rays, for many sprout their oats in dark places, and I have little use for the pale, yellow sprouts grown under such conditions, for they are lacking in the most valuable elements—the anti-rachitic elements, and in the elements that prevent certain eye lesions, etc.

Green food is also a prominent source of minerals. As to the amount of green food that should be fed, no limit should be put on this. Give them all you can, and then there is more danger of an under supply than otherwise. There are only two conditions that warrant curtailing this agent, and they are: When the eggs become too watery where fresh watery green feed is abundantly fed, and second, where the bowels become too loose from the same cause, for green food is a good laxative, prevents constipation, eliminates toxins, etc., but will occasionally produce too laxative effect when abundantly supplied, and when in an excessive watery condition. However, by far more diseases are caused by lack of green feed than by over-feeding it. Pale, yellow egg yolks are generally present when we feed

Single comb Rhode Island Reds, 8 weeks old. Average weight, 1.4 lbs. each

too little of this element. A deep yellow colored yolk is present when a sufficient amount is supplied.

Codliver oil (Oleum morrhuae) also possesses valuable elements that prevent and control many deficiency conditions, and can often be worked into the ration with advantage. More will be said about this agent in dealing with the article on nutritional diseases.

Grit, oyster shells and charcoal should be supplied in suitable hoppers and kept constantly before the birds at all times. The grit is stored in the gizzard and acts as a grinding machine, reducing the grain and other food eaten to find particles that can be more easily acted upon by the digestive ferments. In other words, grit acts as the "hen's teeth." Oyster shells supply the necessary calcium and also can be substituted to some extent for grit. Charcoal acts as an absorbent of excess of liquids and gases in the intestines; if too much be eaten it occasionally causes impaction, especially in young chicks.

Water should be supplied at all times; it should be fresh and clean and frequently changed and given in clean vessels that are thoroughly cleaned daily, and frequently scalded.

The surface has but been broken when it comes to the feeding problem. Only a practical discussion has been attempted.

Cats in India

Half-Castes Unappreciated by Natives, Not to Be Tamed

By GEORGE CECIL, Paris, France

Where English Grimalkins Languish

THE PURE-BRED Indian cat does not appeal to the exiled fancier. Large-eared, rat-tailed, always thin, and too long in the leg, the *billi* lacks admirers, even amongst persons who have omitted to make grimalkin their life's study. Fortunately, there are innumerable cross-bred cats, in whose veins courses the blood of Persians procured from the Arab stables in Bombay, Angoras, and genuine English mousers—sent out from "Home." These animals, though scarcely perfect, have their points, since they usually rejoice in good tails suggestive of the Persian strain, and something resembling a ruff. The ears often are small and feathered.

The half-castes run to odd coloring. In Calcutta, for example, many years of cross-breeding have nearly ousted the yellow hue which is part and parcel of the Indian variety. Tabbies are plentiful; tortoise shells abound; the cream Siamese tint is reproduced, though the distinctive blue eye is uncommon. Imported English cats, by the way, do not stand the heat of the "plains": only in the "hills" do they thrive. So, the moment the highly unpleasant and enervating "hot weather" sets in, humane Anglo-Indians dispatch their furry treasures to Simla and to other cool spots in the Himalayas. Blocks of ice are provided at intervals, by the railway authorities, in order that the crated cat may breathe in comfort. Pussy relieves the situation by licking the ice. . .

Sometimes the poor *billi* does not survive the wearisome journey, a species of heat-apoplexy, or a fit, taking its toll. And the change to a cold Himalayan night may prove fatal to a constitution weakened by the pestiferous climate of the sultry "plains." Not one English cat in twelve lives as long as could be wished.

A Shaggy-Haired Mouser

Bombay is prolific in Persians—and their descendants. Shiploads constantly arrive from ports on the Persian Gulf, good specimens quickly changing hands, and at corresponding prices. Hundreds of miles higher up on the rocky frontier, where the blood-thirsty tribesman slaughters the white man, the Afghan cat, a creature with shaggy hair, almost like a goat's, and a singularly deep "miaow," flourishes. Traders bring them, on camel-back, from Kabul, and mercifully, they speedily become acclimatized. Making friends with the yellow and lean Indian *bazar* cats, the strangers quickly stamp their image on many a kitten, some of whom, fortunately, resemble the Afghan father. Others inherit the paternal shaggy coat and the maternal rat-tail—a strange combination.

Odd-looking, too, is the species to be met with on the tea gardens round about Darjeeling. The native mustard-colour is relieved by blotches of grey and brindle, the tail sometimes being ringed and tipped with black or white. The eyes usually are brown, though one comes across the *"creme-de-menthe"* shade. These Darjeeling cats are mostly thin, and, like the "plains" variety, cursed with long ears.

Friendly Overtures Repulsed

Few Indians appreciate the cat, their love being given elsewhere. A *Rajah,* who has enjoyed the advantages of Eton and Oxford, occasionally invests in a few Persians, or Angoras, with a sprinkling of imported short-haired English tabbies to keep them company. But the average native cares little for animals; they are, according to the Mahometan and Hindu creeds, "unclean," forsooth. The Europeans alone value grimalkin at its true worth. . .

Attempts have vainly been made to tame "jungle" cats. These wild things refuse to look upon the bungalow as their home, while they view with suspicion the most friendly overtures. Their spotted coats are more handsome than their behavior.

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Pre-Parturient Paralysis in Ewes

By E. T. BAKER, Moscow, Idaho

FOLLOWING one of the wettest winters ever known in the Northwest, was a cold, late spring. From the middle of last September until the latter part of April chains were necessary in this part of the country, and most of the time, country roads impassable.

About the first of February, letters began to come in from practitioners located in Oklahoma, California, Wisconsin, Illinois, Missouri and other parts of the country that they were having a lot of grief with sick ewes. A variety of symptoms were detailed, the principal one being that the animals usually died getting well.

About this time, the writer began to receive calls from small sheep owners. The first one was to look at a flock of 250 ewes. About 40 had aborted; ten ewes had died, and several dozen weak lambs had been born, only to open one eye, take a peek at the snow-covered hills, and then pass on.

However, in this case, the diagnosis was comparatively easy. The owner had given the ewes rock salt, and they had swallowed enough to produce a poisoning when it had all dissolved. His hay had also been frosted when several inches high, and had some mold.

The next call was to see about 30 pure bred Shropshire ewes, given the best of care, and fed clean oats, hay and some bran. They were not overly fat, and had been given all the exercise they wanted. Half a dozen had died, and some more were totally paralyzed.

A number of calls along this same line now came in, and some inquiries from large sheep men of southern Idaho. The latter were advised to call in their local veterinarians.

About the middle of March a big outfit in central Washington running about 14,000 head called us up. Taking our trusty graflex, we departed for the scene of action.

We might say in passing that sheep are brought down from the summer range in the national forests about October, and the bucks turned in. The home ranch is usually along some river valley, well protected from the snows and blizzards of the high line. Huge stacks of alfalfa afford feed, but in mild winters the sheep can run out on the hills and pick enough bunch grass to live on, except in very cold weather.

About the first of the year, the ewes are fed some, and when they commence to lamb in March, they are taken into the lambing sheds. Here, hundreds of small pens are staked off, and the ewes are kept in these until their lambs can navigate.

Depending on the climate, lambing usually runs from the middle of March to the first of May, and a boiler factory is a quiet place compared to a lambing corral.

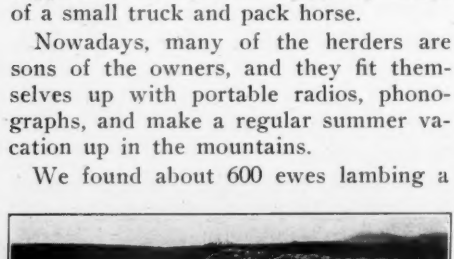
Everything is run on a business like scale. Several herders take care of each band. Others do the feeding. One usually does nothing else but "pelt" the dead sheep, and others act as midwives in cases of dystocia. "Sheep dip" is the common antiseptic, and the herders keep themselves in good physical condition by frequent and copious doses of "mountain dew."

The lambs are docked, castrated, ear marked and branded. Later, shearing the sheep is in order, which is now commonly done with power clippers. In many places, the sheep are run through a trough of dip to rid them of ticks, or a possibility of scabies. Then along about the latter part of May the sheep are divided into bands of two thousand head each, and started out for the summer range in the mountains. Each band has

a herder in charge, with several well trained dogs. A "camp-tender" looks after the whole outfit; carries mail and supplies to the different herders by means of a small truck and pack horse.

Nowadays, many of the herders are sons of the owners, and they fit themselves up with portable radios, phonographs, and make a regular summer vacation up in the mountains.

We found about 600 ewes lambing a



Western Range Sheep on way to Market.

day, with a loss of around 50 ewes and 150 lambs a week. The clinical symptoms were many and varied. The length of illness ran from a few hours to several weeks. Some were paralyzed from the start; others would eat up to a few hours before death. Some were in a coma; others delirious. Some died without an effort; others had convulsions. In some abortion occurred. Some were fat and others were poor.

The most constant feature, however, was the presence of twin or triplet lambs in the sick ewes. A number of them had dead lambs, with a seemingly uterine inertia.

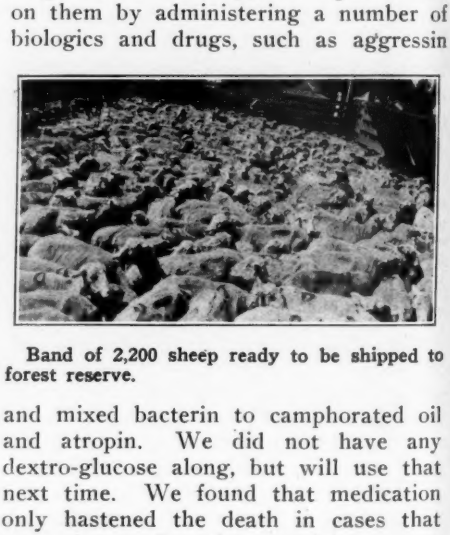
The question then arose: Did the lambs die first and the resultant septicemia cause the paralysis, or did the condition of the mother kill the fetus? When I asked one of the herders this question, he said the only thing he had ever answered correctly in these "Ask Me Another" queries had been: "What prominent general is buried in Grant's tomb?"

The temperature of the sick animals ran from 104° to 106° F. The clinical picture might lead one to think the ewe had any one of the following diseases coming to mind: Eclampsia, milk fever, stercoremia, impaction, toxemia, septicemia, enteritis, pneumonia, apoplexy, metritis, tetanus, forage poisoning, malignant edema, blackleg, gangrenous mastitis, hemorrhagic septicemia, and finally, complete cessation of the heart action, which often terminates fatally at this altitude!

We might say that later microscopical examinations of the blood tissues revealed no trace of any infectious disease. Rabbits and guinea pigs were used also.

On autopsy, about all one finds is a mass of dark colored viscera. There may be some gifted experts who can cut into a deceased animal and immediately place their finger on the exact cause of the funeral, but the writer is unable to do this. In fact, there are numerous cases when the only pathological lesions visible to the naked eye are what veterinary inspectors tramp over on the killing floor!

Using about twenty ewes in various stages of the malady, we experimented on them by administering a number of biologics and drugs, such as aggressin



Band of 2,200 sheep ready to be shipped to forest reserve.

and mixed bacterin to camphorated oil and atropin. We did not have any dextro-glucose along, but will use that next time. We found that medication only hastened the death in cases that were down. In other words, we were about as helpless as veterinarians were before the air treatment was devised for milk fever.

Ewes not down were given small doses of nux, cascara and mucoseptone on the tongue three times daily, and improved greatly. Those showing signs of dead lambs were cleaned, and a No. 11 capsule, filled with boric acid, sodium perborate and pix-cresol inserted in the uterus, without douching. Where there was much odor, a teaspoonful lysol was mixed in a gallon warm water and introduced into the uterus, with a hose and funnel. This reduced the loss greatly.

One pound powdered potassium iodid was mixed in 250 pounds dairy salt and given as a lick to each 3,000 sheep. All the animals were given some whole oats and bran. The pens were cleaned out and a few handfuls of lime and sulphur (five to one) sprinkled under the bedding.

In a few days the loss was cut down to several ewes a day, and inside of a month the owners called up and said the results were fine. Fortunately, some warm weather appeared and this probably had as much to do with the results as the line of treatment.

However, this fall they figure on having a band immunized with aggressin or mixed bacterin, and a line of minerals fed the ewes. It will be interesting to see whether the condition can be cut down to near a normal loss.

Just as the swine experts are unable to say what causes the so-called "flu," mixed infection or what have you, simple-minded practitioners like myself, who meet the actual clinical conditions in the field, are unable to give this ailment in ewes a single name.

Practitioners can prevent this trouble in ewes if there is no infection present, by prescribing the following ration: One hundred pounds whole oats, 25 pounds bran and 10 pounds brown sugar, mixed well together, and feeding a handful of this to each ewe once daily a month before lambing. Just exactly what effect the sugar has on pregnant animals will probably be more fully understood in the future. Molasses, corn syrup or any of the dextro-glucose mixtures may be used.

However, we would suggest that veterinarians living in sheep raising communities, devote a little time and attention to this malady. You will have cause to use what information you have learned along about next winter.

First Stage—paralyzed sheep. Stercoremia or impaction in pregnant ewes, causing a rapidly progressing septicemia.

Second Stage—paralyzed sheep. This animal was lying on its side looking like a principal in an oil probe. It died next day.

General Pershing and Staff at the head of his army at the Fetes de la Victoire on the Champs Elysee, July 14, 1919.

SADDLE HORSES IN DEMAND

Much information, some fallible and some infallible, is being broadcasted on the question "are horses coming back?"

It is evident particularly to those who have attempted to purchase a reliable horse of any kind, and particularly good saddle horses, that these valuable animals are becoming scarce. This fact was evidenced at a recent sale in Mexico, Mo., at which place 200 saddle horses were sold for over $40,000, one eleven months old filly brought $2,650. Prospective buyers from practically every state in the union were present at this sale.

From this town originated Mascot, the winner of the gelding class at the Chicago World's Fair in 1893; the famous three gaited saddle horse, Panama, which was many times champion at the National Horse Show in New York; and the chestnut gelding Amber Crest, and the three gaited saddle mare, Nancy Beloved.

At the recent sale held in Mexico, Mo., 14 yearlings that were bred near Mexico were sold for approximately $7,000. Incidentally, it might be mentioned that Mexico was for many years the home of Jimmie Robinson, champion bare-back rider of the world. In fact, almost every resident of Mexico, Mo., is a horse man and even though they do not own horses believe they are familiar with the different breeds and can all talk "horse talk!" —A. T. K.

A group of veterinary reserve officers at Camp Custer, Mich., 1923.

Business Methods in Veterinary Practice*

By HENRY HELL, V.M.D., Wilton Jc., Iowa

THE primary essentials for successful business are, first, sufficient volume to insure a turnover cost that is not above that of competitors. Second, a fair and legitimate profit that is adequate to cover overhead, or so-called turnover, cost and leave some net profit. It then becomes quite plain that the larger the volume of business that may be done with the smallest investment the more times that capital may be turned during the year, the greater the profit; for example, a man with $10,000 invested in a given business would sell $15,000 during the year at a profit of 5 per cent net; this would give him a net earning of 7½ per cent on his invested capital per year. But suppose he had only one-tenth of this capital invested and the sales were the same, he would net 75 per cent on his invested capital.

I want to make it clear that the man who today spends $4,000 for a veterinary education must earn more in order to earn a fair return on his investment than did the man who received his training 25 years ago at a cost from $500 to $1,000. In the matter of running expenses it might be well to consider that it costs more today to conduct a practice than the average practitioner earned prior to 1910. Therefore, it is necessary that the volume of business done by the practitioner of today be several times greater than that of the practitioner of 20 years ago.

From the United States Bureau of Statistics we learn that the average cost per dollar of retailing is 27 cents. This is an average for all lines except groceries, where, on account of its small investment and quick turnover, the cost is less. I have on several occasions tried to calculate the cost of earning a dollar in practice. While figures may vary considerably with the condition under which the service is rendered, but when an average is struck it will be found that office and transportation cost will amount to 25 to 30 per cent of the total charges for general practice calls. Failure to reckon the cost of doing business is often the answer to a fairly good year's business with nothing to show for it at its close.

Business is ordinarily reckoned in four phases that may be grouped or subdivided according to the nature of business to which they are applied. These phases are: Production, sales, accounting and collections. It therefore becomes obvious that the man conducting a one-man business as does the private practitioner, needs be a somewhat well balanced unit having a fair degree of proficiency in each if he is to be universally successful.

No two men are constituted alike; neither are the clients of two practitioners alike. As these men and their clients differ, so must the manner in which they conduct their respective practices differ, and no specific rules or regulations can be laid down for the conduct of a given practice, except by the man who is conducting it, and gives it his daily attention.

Probably the greatest asset of any business is its reputation for honest dealing, reliability of its wares, prompt and efficient service, and there is no valid reason why these do not apply to private practice as well as other purely commercial endeavors.

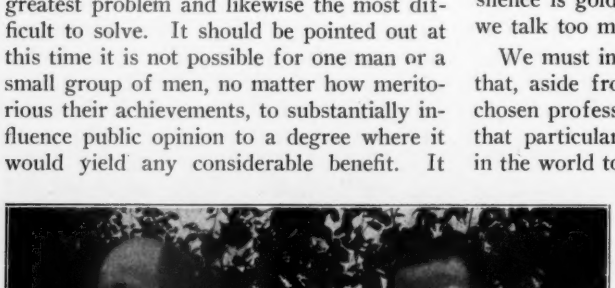
The satisfied client is the basis upon which every successful practice must be founded; and the best way to gain the confidence and good will of your client is to deserve it.

In considering the different phases of business, in a one-man business like ours, production and sales may be considered

* Presented at the annual meeting of the Iowa Veterinary Medical Association, Des Moines, January 18-21, 1922.

under one head. Production with us depends upon and varies with the needs of the live stock community where we are located and how the service which we dispense appeals to our patrons.

To make our work attractive to our clients and prospective clients is of course our greatest problem and likewise the most difficult to solve. It should be pointed out at this time it is not possible for one man or a small group of men, no matter how meritorious their achievements, to substantially influence public opinion to a degree where it would yield any considerable benefit. It then becomes quite obvious that it is necessary for the general public to have a favorable opinion of the rank and file of the profession before we can hope to enjoy public appreciation of the work of the profession.



J. C. Flynn, Kansas City, and J. G. Horning, Houston, Texas, two of the best known small animal practitioners of the whole country, owe their outstanding success as practitioners quite as much to their superior business ability as to their professional attainments. Without good business methods they would never have attained their present high standing.

The success or failure in a neighboring practice; or that reported in a farm paper, has its relative bearing on your practice and its future well being. The general public must have a favorable conception of the service that you are selling if you are to attain above the average success.

In dealing with the laity we must be on our guard at all times against being misunderstood and misquoted. With this end in view, we should never try to instruct our clients beyond their power of comprehension. We must at all times use non-technical language so that we may be clearly understood, and where you are in doubt as to ability to comprehend on the part of your client just remember the old saying that silence is golden. I am of the opinion that we talk too much not too little.

We must impress on the live stock owner that, aside from making a living from our chosen profession, it is our mission to make that particular community the safest place in the world to own a dollar's worth of live-stock. Impress the fact that the interest of the livestock owner and of the veterinarian are identical, and a greater livestock industry means a greater veterinary profession. In the matter of salesmanship, we should not hesitate to recommend any recognized line of treatment that gives reasonable assurance for 65 per cent or more of favorable terminations. Should we wait for favorable terminations. Should we wait for remedial agents that assure us 100 per cent recoveries, chances are that our services would not be so much in demand.

A certain amount of field experimentation is justified in every private practice; for without this research would be considerably slowed up. The laboratory worker can go only so far in the development of certain treatments, when he must then turn them over to the field men for further development. An admirable demonstration of this was bringing hog cholera vaccination from the status of 1911 to that of the present day. The laboratory man and the man in private practice, working hand in hand, make for the greatest results in the field of research and for the greatest benefits of the profession and the nation.

We have been admonished so often as to

our personal conduct and appearance that I am going to pass this subject at this time.

We should give our opinions in the matter of prognosis as we see them; to temper them with either optimism or pessimism would discount their worth just that much. The days when we were supposed to know it all; or, at least, when we thought we were supposed to know it all, have gone. It is no longer a reflection on your ability to tell your client that you do not know what is the matter with the case, and in four cases out of five the owner will respect you for being frank and honest with him, and will have greater confidence in you than if you tried stringing him along.

Another thing to be avoided is disagreement with your neighbor veterinarian in the matter of care treatment and diagnosis, for nothing detracts quite as much from the prestige of the profession as to have two of its members take opposite sides upon a professional question, especially if it happen to be in litigation where both are witnesses. This is equally true of disagreements between practitioners and state, federal and college veterinarians. The practitioner has been high-hatted far too often for the good of the profession as a whole.

It is absolutely necessary that we give to each case our very best and careful consideration, and that is not all; when you have any spare time on your hands you should review all cases treated by going over whatever literature you have on that particular case. It is well to visit with your neighbor veterinarian and talk shop and if you both do not benefit from such visits there is something wrong with one or both of you. I know some veterinarians who literally threw their books away when they graduated from college. This is probably one of the major reasons why the profession has not enjoyed a higher place in public opinion.

Some things brought out in this paper may seem to be somewhat beside the subject, but I believe it absolutely necessary for every member of the profession to measure up to a certain standard before we can hope to come into our own as a valuable asset to the resources of the state and nation. I do not want to be misunderstood as making apologies for the American veterinarian. I am firmly of the opinion that he has no apologies to offer for either his training or achievements.

There is very little to be said about accounting. We take it for granted, that every one keeps a fair set of books, that

J. A. Kiernan (reader's left) and J. A. Barger at the head of the tuberculosis eradication forces of the U. S. and of Iowa. These illustrious veterinarians have made it their business to get along with people peaceably. Formerly in tick eradication and for the last 10 years on T. B. they and many others in both fields have been successful in their specialized line of business which is to get livestock owners to do unpleasant things without compulsion.

show what is due from his clients; and as most of us are not concerned with income tax reports we will pass this over with just a word about a record of the use of biologics. Nearly every biological product has a serial number and it is quite an easy matter to make a record of this on your day-book when you enter the charge for the work. It is just as easy to charge John Jones so much for serum No. 876 as it would be to charge him and not give the number. I favor this method over keeping a separate record for the reason that your day book does not get lost, while the other might and while you might forget to keep the separate record you are not going to forget to make your entries in the day-book.

Volumes could be written about collections. It is unnecessary to repeat that, as many bills as possible should be collected when the service is rendered. We all know

it is not always possible to collect at the time of rendering the service. Nearly every line of business extends credit to its customers and we practitioners cannot get away from it. The credit evil, like the poor, is always with us. There seems to be but one solution of the question (and that falls short in all too many instances), that is to extend credit to those who have proved themselves worthy of credit, and withhold it from those who do not meet their obligations. This cannot be accomplished in a day, week or a year. Every man must cull his credit list systematically and often, and determine to his own satisfaction who is and who is not worthy of credit. Do not extend more credit than absolutely necessary where serums and biologics are used. Cash payment should be insisted upon ordinarily when such products are used.

BENESCH'S CAUDAL ANESTHESIA

Sometime ago I read of the Benesch method of anesthesia, and the first chance I had I intended to try it. Since then, I have located in an exclusive dairy country and no doubt I will have several chances to try it, and as a new man, I want it to go right, and am going to ask a few questions.

Do you pass the needle through the spinal cord. The March issue of Veterinary Medicine says go to the floor of the canal. Is there any danger of permanent paralysis or any other trouble. I want to be sure before exposing myself in this place.—H. H., Ohio.

Reply: In the Benesch caudal anesthesia, the injection is made into the spinal canal in the space between the first and second coccygeal vertebra. The spinal cord does not extend back this far. The nerve structure at this point is the cauda equina—the aboral termination of the spinal cord comprising the aggregated sacral and coccygeal nerves.

The point for inserting the needle may be located by noting the lowest depression between the vertical spines of the vertebra in that region. If the hair is long, the depression may not show on inspection, but it may be readily felt by passing the hand from the sacrum back over the root of the tail. The lowest and largest interstice is between the first and second coccygeal vertebra.

Another way of locating the site of injection is to grasp the tail and move it through a wide arc. The point at which the greatest movement between the vertebrae occurs is between the first and second coccygeal segments.

Make the injection by standing the hypodermic syringe perpendicularly, press the needle straight down until it strikes the floor of the canal. Then, release the pressure on the syringe, the tissues will raise the needle slightly, when the anesthetic should be injected.

If aseptic precautions are observed and a solution of the local anesthetic not stronger than one per cent. is used, no harm can result. A three-fourths of one per cent. of procain is recommended. The quantity of the anesthetic injected determines the extent of the anesthesia. That is, the solution works forward from the point of injection.

20 cc. in a small cow produces anesthesia of the genital organs and the tail, only. Double this amount produces anesthesia and paralysis of the hind quarters and the udder. Where you want the animal to remain standing, you, of course, can use only the smaller amount. In large cows, as Holstein's use 30 cc for the minimum injection and 50 to 60cc for anesthesia of the udder or hind feet.

Cancer of the ear of sheep is of common occurrence in Australia and according to Dodd, these neoplasms may be the result of irritation induced by identification marks or tags. It is generally assumed that certain types of malignant tumors may be caused by long continued irritation, however, an increase in malignant tumors has not been reported in cattle in the United States and several million have been ear marked and tagged during the last few years as a part of the routine in tuberculin testing.

KANSAS STATE AGRICULTURAL COLLEGE JUL 2, '27 LIBRARY

Fever Tick and Tuberculosis Eradication Project*

By L. J. ALLEN, Oklahoma City

OF THE Federal and state cooperative projects it may be said, that at the present moment, the eradication of ticks from Oklahoma is in a fair way to be completed within the next two years. Scabies in cattle and sheep has reached the stage wherein it is necessary to maintain a nominal force only, that is, one bureau and one state man to cope with infection occasionally introduced from infected herds in adjoining states.

Hog cholera control work, while important in a general way, does not promise by methods now practiced or proposed to bring about complete suppression of that disease.

Tuberculosis eradication in animals, so desirable from both an economic and public health standpoint, cannot be said to be fairly started.

Tick Eradication

Tick eradication, disappointing as the slow progress may seem to some, has carried results amply justifying the effort and expense. Three-fourths of Oklahoma including a still greater proportion of the general farming area was, in 1906, the home of the Texas fever tick, from which, up to that time, no effort had been made to dislodge him. Can you imagine a general farming industry, to which most of the original tick area of Oklahoma is adaptable, without cattle as a necessary adjunct? Then, can you imagine that such cattle as it is possible to raise under tick conditions contributing materially to the success of agriculture? If you can't, then it must be admitted that the eradication of the fever tick was the first essential project, and it has so proved.

Better and more successful agriculture in its branches of dairying and meat production has followed closely the eradication of ticks in this and other states. Ticks, as an inhibiting factor, contributes tremendously to the unbalanced, one-crop system of agriculture, resulting in the cotton raising section of our country and to the fast increasing bill for commercial fertilizer.

The eradication of ticks commenced a little more than 20 years ago. Many enthusiasts then thought it a task of but a few years, notwithstanding, no man at that time either possessed or had thought of a workable method for doing it. Nothing better than the rotation of pastures and hand application of crude oil had been suggested. Think how impracticable to head-and-heel-rope some ten million cattle, not once but eighteen times at two weeks intervals, and apply the crude oil, or to rotate pastures in a country like McCurtain County, where a cow might travel forty miles without seeing a fence, and much of the original tick infested area of our country is open range.

Then, too, the problem of selling tick eradication to the owner and the influence of the petty politician had not been properly weighed by those who had not the task of its physical accomplishment.

While, obviously, there is no way of reaching a definite conclusion, I believe we are justified in the estimate that the unfavorable attitude of no inconsiderable percentage of the owners, combined with the influence of the ever alert but petty politician playing to, and nursing the prejudice of the owner, has resulted in a waste of $90.00 out of every $100.00 of the millions spent by all the cooperating authorities for tick eradication and will have prolonged the job nearly in like proportion.

* Presented at the Annual Meeting of the Oklahoma Veterinary Medical Association, Jan. 17-18, 1927.

This political hindrance has been much more noticeable in some states than others, and during certain administrations than during others in the same state.

In Oklahoma, while the work has stood still or gone backwards for the last few years, that is attributed mainly to the lack of state funds to cooperate with the Bureau. The prospects now are bright for a resumption of an offensive campaign to dislodge the ticks in the only one whole county and parts of adjoining counties which will carry it to the Red River on the South and to Arkansas on the East from which latter line the Arkansas and Federal authorities may be depended upon to continue to carry it on as they now are in a most successful manner.

Scabies in Cattle and Sheep

Scabies in cattle and sheep, which we all know is seldom directly responsible for death, is of considerable economic importance in that, should we fail to maintain the small force that we have in Northwest Oklahoma, that disease of cattle would soon become prevalent due to its occasional introduction from infected areas in adjoining states. We know of no case of sheep scab in the state but have a recent report of a suspected case not yet verified.

Cholera in Hogs

While it is not possible to accurately weigh the benefits accruing from the cooperative efforts to control this disease, it is believed that they many times offset the cost. Particularly do we think this is true in any state, if there be one other than this, which has statutes so unfavorable to the practicing veterinarian interesting himself in this malady, which so recently menaced the swine industry of our country.

Tuberculosis

Tuberculosis eradication work was initiated in this state with a considerable flourish in 1919. The accredited herd work to which the project has thus far been confined, soon disclosed many badly diseased herds of both dairy and beef cattle. Beef herds which, up to that time, had enjoyed good reputations were found, as later developments disclosed, to have been a source of rather wide spread infection of herds of unsuspecting owners in this and other states.

As high as forty per cent. of all the animals in some well advertised dairy herds, the milk of which was alleged to be safe for babies, was found to be positively tuberculous. And the pity of it all is the lamentable fact that that condition is little if any improved, if, indeed, not actually worse now than then, from the simple fact that not to exceed about 2% of the 600,000 milk cows of the state from which we derive butter, milk, ice cream, and other dairy products, so essential to our well being, are annually tested for tuberculosis.

If, as it is reasonable to assume, the 98% of untested dairy cows are affected with tuberculosis to the same degree as the 2% tested, then we have some 12,000 tuberculous cows contributing to our daily supply of dairy products. This would be serious enough if we knew the products of the healthy animals were wholesome. But, not only is the milk of the diseased cow as a rule mixed with that of the remainder of the herd, but that, again, in the commercial handling of same, is generally mixed with the products of many herds; thus the product of actually hundreds if not thousands of animals may be contaminated by the obscure, unsuspected and well meaning but tuberculous cow. All this and more, this assembly well knows, but the general public, and indeed, civic organizations and many health officers are unmindful of the misery, deformity, and death caused by the milk of the tuberculous cow and that this important source of tuberculosis is rather easily preventable. There is hardly a public health project, it is submitted, that should call more strongly for immediate action than the elimination of this source of disease to the human, especially children.

Unless this state wishes to totally ignore the economic importance and public

health menace of tuberculosis in live stock, which it is not believed it does, then, in order to place this project on a workable cooperative basis with the Federal government, allowing the latter to participate in operating expenses and in the payment of indemnities, and to an extent somewhat commensurate with the beef and dairy interests and with the value we place on human life, then there should be suitable legislation enacted giving authority and providing funds to put such work in operation.

A bill under which cooperative tuberculosis eradication, including area work, has, I understand, been introduced at the present session of the legislature. Such a law, however, unless an appropriation is made sufficient for its operation will be little value.

CHICAGO'S PURE MILK CAMPAIGN*

Chicago's pure milk campaign has an intimate relation to a nation-wide program for the control of tuberculosis in live stock. It is conceded to be the greatest single factor which has contributed to the eradication of tuberculosis in food-producing animals.

I have been in charge of the co-operative tuberculosis eradication work for the federal government in the State of Illinois since the program was inaugurated in the year 1918, and have been vitally interested in the phase of the work done by the Department of Health of Chicago. I can, therefore, speak from personal knowledge of the eradication work as well as from examination of the official Health Department records.

Chicago now has a milk supply which is unsurpassed in quality, healthfulness and purity by that of any other large city in the country. Every day our citizens have available 1,500,000 quarts of milk, obtained from healthy cows, produced under supervised sanitary conditions and properly pasteurized in tested equipment.

The outstanding accomplishments in improving the safety and wholesomeness of the city milk supply during the past year include the following:

1. The requirement that all milk sold in the city must be from healthy cattle was adopted and effectively enforced, without curtailing the supply or increasing the price to the consumer.

2. Improved quality and further safeguarding of the milk supply at its source have been secured through increased inspection of dairy farms.

3. The proper pasteurization of all the milk has been secured by correcting defects in milk plant equipment which were disclosed by a detailed sanitary engineering survey of all plants.

Western Sheep on Forest Range.

4. The co-operation of the U. S. Public Health Service was secured with the result that its pasteurizing equipment testing station is located in Chicago.

5. The quality of the market milk supply as measured by bacterial counts was improved 45 per cent. over the previous year.

6. The improvement in Chicago's milk supply has evidently contributed toward a marked reduction in deaths of infants under one year of age. The records show that there were actually 532 fewer baby deaths during the year ending March 28, 1927, than in the preceding year. This amounts to an 11.5 per cent. decrease. Deaths from diarrhea and enteritis among children under two years of age were reduced 33.2 per cent. during the same period, resulting in 274 fewer deaths from this cause.

Chicago, Ill. J. J. Lintner,
Inspector in Charge T. B. Eradication.

* From Chicago Health Bulletin, April 12, 1927.

OPINIONS ON NECESSITY FOR TUBERCULOSIS ERADICATION

Milk, even though efficiently pasteurized, should be obtained from healthy cows and produced in a sanitary manner. Pasteurization should never be used to cloak the furnishing of dirty or stale milk, or milk that is known to be infected. The programs of pasteurization and tuberculosis eradication should go forward at the same time. Both are essential—neither alone is adequate to assure safe milk.—Hugh S. Cummings, Surgeon General, U. S. Public Health Service.

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I believe that milk, even though pasteurized, should be obtained from healthy cows and carefully handled to prevent dirt contamination and infection. We are entitled to clean and fresh milk, even though rendered safe by pasteurization. —Milton J. Rosenau, professor of preventive medicine and hygiene, Harvard University.

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I have given this matter considerable thought and have come to the definite conclusion that, regardless of whether the milk supply is pasteurized or not, the campaign for the reduction of tuberculosis should continue. Milk, even though pasteurized under most favorable conditions, and quite efficiently, should not be obtained from sick cows.—David J. Davis, dean, College of Medicine, University of Illinois.

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It must be conceded that in addition to pasteurization of raw milk, it is also desirable to eliminate from dairy herds all diseased cows, especially tuberculous animals, which are so dangerous as to produce even ten per cent. of the cases of human tuberculosis. The proper kind of milk to pasteurize is that which is as safe and pure in the raw state as milk can reasonably and economically be made. The tuberculosis eradication division and the dairy division are in accord with regard to the importance of both the tuberculin tests and pasteurization as public health measures in connection with our milk supply.—John R. Mohler, chief, Bureau of Animal Industry, U. S. Dept. of Agr.

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In my opinion the effort to have milk furnished by tuberculosis-free cows should not be relaxed in the slightest degree. While every effort should be made to extend pasteurization and to put safeguards around it, it is of no less importance that we continue the eradication of disease, especially tuberculosis, from our dairy cattle. If tuberculosis is allowed to go unchecked, the necessity of fighting this disease will be apparent from the economic standpoint alone.—Mazyck P. Ravenel, professor of bacteriology and preventive medicine, University of Missouri.

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In my opinion everything in reason should be done to secure healthy dairy herds free from tuberculosis. There does not seem to be any question that all reasonable efforts toward this end will be of economic advantage in reducing bovine and swine tuberculosis at the same time; as the opportunity for human infection with bovine tubercle bacillus will be lessened greatly.—Ludvig Hektoen, director, John McCormick Institute for Infectious Diseases, Chicago.

The value of mineral supplements depends upon the percentage of minerals in the feeds. Mineral content of feeds is directly dependent upon the available minerals in the soil and thus there is a marked variation in the per cent of minerals in the same kind of feed produced in different locations. It has been found that the addition of calcium and phosphates to the ration of swine in the Pacific Northwest states always increases the weight and strength of bones and usually is an economy in the matter of gain. A mixture that has produced good results in swine in those areas in which the soil is deficient in lime consists of equal parts of salt and ground limestone. A good mixture for dairy cows in deficient limestone areas is four parts ground bone meal and one part of salt.

Methods of Inaugurating Municipal Milk and Meat Inspection*

By FRANK R. KNOTTS, Stillwater, Okla.

THE problem of efficient and systematic municipal meat and inspection has confronted food inspectors of every city of any size since the organization of the Federal bureau of animal industry. The formation of the Bureau of Animal Industry of the U. S. Department of Agriculture by the government naturally attracted the attention of helath committees of cities and towns for if foreign countries were refusing to accept our meat without a scientific inspection there was a reason to be concerned about our own welfare. The rules of the U. S. Bureau of Animal Industry were formulated and instituted in the larger abattoirs. First, to promote the interstate and foreign shipments of meat. Second, to maintain proper sanitation at abattoirs. Third, to insure the public of a source of wholesome meat and meat food product, and fourth, to control disease conditions of animals used for human consumption. These federal regulations improved and amplified to safeguard national health and welfare, are usually adopted and enforced by health committees of cities desiring to control the local meat supply. Unfortunately, so far as I know but few cities in Oklahoma have city meat inspection where post mortem inspections are made.

The state law governing ante-mortem inspection should be repealed. Our towns and cities should pass ordinances governing the sale of meat and milk. Milk inspection has followed meat inspection but has been handled more by city regulations, ordinances or health departments.

The first essential in establishment of municipal inspection is the kindling of local sentiment in favor of it. This can be done by having a comparative study made of conditions as they exist at home and in some nearby city or town where inspection is in force. A showing can be made as to the prevalence of tuberculosis in hogs and cattle and the ease with which tuberculous meats may be placed on sale by local butchers. Trips to insanitary as well as sanitary dairies and markets should be undertaken by leading citizens, city officials, physicians, veterinarians and newspaper men usually reveal convincing evidence of the need of city inspection. Due publicity can then be procured through local newspapers. Copies of ordinances from other towns may be secured to show what plans are being followed elsewhere and a local ordinance drafted which fits the needs and conditions of the municipality.

The ordinance must be of such a character that its outstanding intent is to safeguard the public health without imposing unnecessary hardships or impossible conditions upon producers and dealers or without any suspicion of providing a new city office for some faithful ward politician for which the people must pay. The inspector should be granted supervision over all meat and milk products marketed within the city which should where possible include a check or such establishments as abattoirs, dairies, meat markets, eating houses, ice cream factories, soda fountains and the wagons of butchers, peddlers, etc. The best inspection is not 100% perfect but a partial check on conditions is better than none at all.

Funds for carrying on the inspection work in small towns and cities may be obtained in various ways. They may be set aside from the regular revenues of the city wholly or in part. They may

* Presented at the annual meeting of the Oklahoma Veterinary Medical Association, Oklahoma City, Jan. 17, 1927.

come in the form of license fees from the dairies, meat markets, etc., and fees for tuberculin testing and the inspection of meats offered for sale. There are some arguments in favor of each system, an ordinance that is self-supporting by means of fees usually avoids the opposition of the "Watchdog of the treasury."

I feel sure that every veterinary practitioner would be glad to see an efficient system of infection started in his own town and yet perhaps comparatively few feel that they can afford to undertake the job in connection with their practice. In the first place, few cities are willing to pay for the work what it really is worth and the local veterinarian feels that he can not sacrifice the necessary time to the public good for the compensation he would receive. Many feel also that they must of necessity make enemies of some dealers and producers which will naturally work to detriment to their private practice. There are grounds for these opinions and yet it may be that they do not constitute insurmountable obstacles.

It goes without saying that the veterinarian is the only one fitted by training for the administration of milk and meat inspection. Physicians, chemists, bacteriologists or trained laymen may of course take care of certain phases of inspection to advantage where a large corps of workers is required.

When the necessary ordinances have been enacted and authority has been given he can begin to check up conditions. Not too aggressively, he can induce owners of family cows in the interest of safety to health to have them tuberculin tested. He can suggest improvement in handling of the cow and her milk. He can require the testing of all cows from which milk is sold within the city limits, whether the cows are kept within the city or not.

As his time permits he can make the rounds of meat markets, dairies and other establishments of similar character, suggesting wherein sanitation may be improved. Most dealers take such suggestions without resentment if they are given privately in a diplomatic manner. Very often the dealer will ask the inspector for suggestions as to how his place can be better kept.

Inspection of meats at the time of slaughter provides the most difficult problem of meat inspection. All condemned carcasses or parts are appropriately stamped as condemned and are tanked. All inspected and past meats are so stamped and only such meats can be legally sold within the city. Such trips net the inspector less than a professional call but do not require ordinarily more than one hour, and while not profitable can be done with some financial gain. Where cold storage facilities are available carcasses and parts can be held from time to time to suit the inspector's convenience.

Publicity plays an important part in a small town. This may be put before the people in different ways. Articles may appear in the local press. Talks at chamber of commerce meetings, civic organizations, to school children, etc. A great deal of educational work needs to be done. The city health officer could help in getting ordinances passed relating to health.

If a committee of the chamber of commerce, civic clubs, etc., would meet with the city government asking for ordinances governing the sale of meat and milk it would likely be granted.

Model milk ordinances may be had from your state dairy inspector. It may be necessary to make some changes in them. After the ordinance is formulated the city attorney should look over it to see if it could be enforced after being passed. If he O.K.'s it, it is ready to be presented to the city government. After the ordinance becomes a law its success depends upon the ability of the inspector and the cooperation of city government.

There are three distinct and essential features in successful milk inspection, according to the state Department of Agriculture. They are: Dairy inspection, dairy instruction and laboratory control. Dairy inspection regulates the conditions

surrounding the source of supply. Without it the safety of the finished product can not be assured. This inspection also extends to city milk plants and to the workers in them.

A dairy ordinance was passed in Stillwater. I think in October, 1924. At that time only two dairies out of thirteen were equipped to sterilize bottles, cans and utensils with live steam. Some of it was bottled in the street but most of it was taken care of in the regular farmers' way. We now have ten steam boilers for sterilization, dairy barns and milk houses with equipment. Dairymen are selling all the milk they can produce and that they would not want to go back to handling milk again without equipment.

After the ordinance was passed dairymen were given time to comply with the law. Two dairymen quit. More have been added to original list.

License fee is $1.00 per cow per year.

Creamery fee is $10.00 for pasteurizing plant and $10.00 for ice cream and butter making.

All cows must be tuberculin tested by an accredited veterinarian.

SOME POISONOUS PLANTS—GOLDEN GLOW

Dr. L. W. Marner of Wellman, Iowa, writes as follows: "Under separate cover I am sending you three specimens of weeds which I collected from a local farm. On this farm they have lost cattle for three years straight which resembles poisoning. I held an autopsy on one animal that died and found an enteritis which I diagnosed as some form of poisoning."

The plants are as follows: black-eyed Susan, *Rudbeckia hirta;* Sedge, *Carex;* white avens, *Geum canadensis.*

In all probability you will find the golden glow, *Rudbeckia laciniata,* and cowbane, *Cicuta maculata,* where these plants occur, and these latter plants are poisonous. I would not, therefore, be surprised that the animals referred to were poisoned, by either golden glow or cowbane and that in collecting your samples you overlooked these.

Ames, Iowa. L. H. Pammel.

Subject of Cesarean Section in the practice of Dr. L. W. Marner, Wellman, Iowa. Photo taken about a month following operation.

During the latter part of 1926 and the early months of 1927, the migration of large numbers of the native meadow mouse (*Microtus californicus estuarensis*) and of the house mouse (*Mus musculus*) from a land basin in Kern County, Calif., to outlying agricultural districts, caused much annoyance and considerable economic loss to the farmers of the communities affected. The migration received wide publicity in the press.

Officials of the U. S. Biological Survey discovered that many sick mice were included in the migrating horde and large numbers died along the way. A number of the sick and of the recently dead mice were collected and sent to the U. S. Public Health Service Laboratory at San Francisco, where studies determined that the ailment was due to the Bacillus Murisepticus, an organism first described by Koch in 1876.

The B. Murisepticus is indistinguishable from the B. rhusiopathiae suis, the cause of diamond skin disease in hogs, a chronic form of swine erysipelas and related to erysipeloid diseases in man. It is generally believed that these organisms are identical. The virulence of this organism is subject to such vagaries and the pathogenicity of some strains to swine and to man seems so well established, that this epizootic in mice may be of importance both to the public health and to the swine industry of California.

PACKERS AND STOCKYARDS ACT TO BE ADMINISTERED BY BUREAU OF ANIMAL INDUSTRY

The Packers and Stockyards Administration, was abolished by an order of Secretary of Agriculture Jardine, effective July 1, and from that time the enforcement of the Packers and Stockyards Act of 1921 will be under the chief of the Bureau of Animal Industry.

The amended General Rules and Regulations for carrying out the provisions of the act have been further amended by substituting the words "Bureau of Animal Industry" for the words "Packers and Stockyards Administration." All employees of the Packers and Stockyards Administration are to be transferred June 30 to the Bureau of Animal Industry.

This change of organization in the Department of Agriculture follows the general plan of carrying on the regulatory work in a more orderly and logical manner and with more efficiency and economy. Several laws relating to the livestock industry, including the Virus Serum Act, Tuberculosis Eradication Act, Tick Eradication Law, Twenty-Eight-hour Law, Animal Quarantine Act, etc., are enforced by the Bureau of Animal Industry and in the opinion of the Secretary much overhead expense can be saved by adding the Packers and Stockyards Act to this related group. Furthermore, the Bureau of Animal Industry with approximately 4,000 employees scattered throughout the country is in close contact with the livestock industry at many points and has numerous channels of information which make possible prompt and intelligent action. This bureau was formed primarily to carry on enforcement work, the organic act providing for "the promulgation and enforcement of quarantines by the Secretary to control the spread of communicable diseases of animals."

There has, of course, been cooperation between the Packers and Stockyards Administration and the Bureau of Animal Industry but it was only voluntary. The reorganization makes the relationship of the enforcement of the Packers and Stockyards Act to other livestock regulatory work more stable. The entire industry will have a single contact point in the Department of Agriculture.

This movement for better organization of regulatory work is in line with the action recently taken by the Secretary of Agriculture in placing the regulatory work carried on by the Bureau of Chemistry in the Food, Drug and Insecticide Administration, a new unit to take form July 1, and which also is to include the regulatory work now carried on by the Insecticide and Fungicide Board.

According to some writers, cows that react negatively to the agglutination test for abortion disease produce one quart more milk per day than cows that give a positive reaction. This statement should not be accepted without further investigation, because cows may become positive reactors with or without abortion at three or four years of age and continue as positive reactors for years without any clinical evidence of disease.

The quality and quantity of wool is dependent upon proper feeding and care as well as selection of breeding stock. Heavy feeding followed by light feeding results in a poor quality wool. Proper shelter for sheep is essential for the production of a good quality wool. Dipping at least once each year enhances the quality and quantity of the wool.

White diarrhea in chicks has exacted a heavy toll for many years. The treatment of chicks affected with this malady is not successful, however, some practitioners have reported favorable results in some instances, by the use of hypochlorid ("B.K." one part to ninety parts of water) in the drinking water.

Phosphorus deficiency resulting in pica occurs in certain sections of Northeastern Wisconsin. The disease has been observed particularly in dairy cows and is manifested by pica, emaciation, rough coat, dull eyes, enlargement of joints, stiffness, and lameness. The disease can be prevented by providing a ration of proper phosphate content and by the use of bone meal.

Increased Efficiency in Swine Breeding a Veterinary Problem

By A. T. KINSLEY

SWINE husbandry is one of the most important industries in America. In that the swine industry maintains in its present economic relation it will be necessary to increase the efficiency of production and control of disease. The many problems incident to the breeding, feeding and management of swine require the careful consideration and cooperation of the veterinarian and the producer.

One of the most important problems that confronts the swine husbandman is the relatively small production which is due to abortion and sterility in sows and the excessive loss of small pigs. Abortion, slow breeders and sterility are of frequent occurrence in swine. The loss of pigs at the time or soon after farrowing is frequently associated with some disease of the genital organs of the sow, although the boar was, no doubt, an important factor in some cases. Abortion has been prevalent but the pig losses were not all due to abortion. Veterinarians are being consulted by swine breeders for practical information on breeding problems for it is realized that a greater efficiency in production is an economic necessity.

Some breeders have become discouraged and have discontinued the breeding of swine. Many of the breeders of grade swine fatten and market all sows that failed to produce and raise a reasonably large litter of pigs, thus it is evident that one of the most important problems confronting the swine breeder at this time is sterility.

Prevalence

Sterile and slow breeding boars are much more common than is usually suspected. To attempt to estimate the extent of sterility in sows would only be a guess at random. There has been an effort made to obtain definite information relative to the prevalence of sterility but the datum collected thus far is not sufficient upon which to base a definite statement. The condition is apparently equally prevalent in all breeds. It is probable that more sows become sterile after the production of the first litter which may have been normally farrowed or aborted than it is in either gilts or older breeders. Some farms have been carefully surveyed on which 50% of the sows were sterile. In other instances only a small percentage of the sows are non-breeders. It is the exception to find a herd of 15 or more sows that are all breeders. Sterility in sows is more or less prevalent in all sections of the country but it would appear from the available information that it is most prevalent in those areas where swine are produced most extensively.

Many practitioners contend that sterility is more common in young boars than in the mature animal.

Causes of Sterility

An occasional case of sterility occurs in gilts or boars as a result of improper development or malformation of the genital organs. Inbreeding long continued may be a factor in sterility. Insufficient exercise and overfeeding is a common cause of sterility, particularly in gilts.

It is probable that the most important factor in the occurrence of sterility in sows is the influence of previous disease. Infections of the genital organs that produce abortion frequently bring about changes that result in sterility.

Abortion and the production of pigs with a low vitality is a common sequel of swine "flu" and may also occur as a

result of hog cholera and in such instances there may be a secondary infection of the uterus that will result in sterility. Diseased ovaries, no doubt, are an important factor in sterility.

Non-breeding or sterility in boars is usually the result of injury of the genital organs. Such injuries may be due to mechanical interference, but is more frequently the result of excessive use or abuse. Small litters and those litters in which the pigs have little vitality can frequently be traced to pasture breeding or a boar that has had excessive use.

Symptoms

The detailed symptoms of sterility in sows is common knowledge and suffice at this time to state that sterile sows may or may not evidence estral periods. In some the estral period is regular, in others irregular; and an occasional sow is observed that is in heat continuously. A persistent purulent discharge is indicative of vaginitis or metritis. There may be a pyometra or a purulent collection in the tubes.

Sterile boars may show disease or defects of the testicles. Boars with diseased genitals are usually unthrifty and evidence more or less disturbance of locomotion.

Prophylactic Measures

The production of swine can be increased by observing the primary principles of feeding, sex hygiene and sanitation. Breeding swine should not be given a fattening ration but should be provided with a properly balanced maintenance ration. It is very probable that some of the pig losses have occurred because corn and water constituted the ration. Ground oats or barley and semi-solid buttermilk is a splendid food for breeding sows or boars in service. The mineral ingredients in food stuffs vary but from the evidence now available it appears that all food stuff is deficient in the essential minerals and it is advisable to use mineral substitutes, particularly in breeding animals. The addition of mineral substitutes to the feed has apparently prevented the occurrence of rickets. Some investigators report an increased milk production from sows that were provided with mineral foods.

Inbreeding and line breeding are of value in fixing some peculiarity of the breed, but should not be continued until it results in diminished vigor and vitality. Breeding swine should not be kept in small pens but should be so maintained that they are forced to exercise. Excessive use of the boar may cause orchitis which will diminish the vitality of the sperm cell and may destroy them. Boars should not be permitted to run with the sows during the breeding season as this favors excessive service of the boar. A boar running in a lot with sows was recently observed to do twelve services in one day. All breeding should be done in a small pen and after one service the sow should be removed. A young boar should not be permitted to do more than one service every other day and a mature boar one service each day. The excess service in pasture breeding is probably responsible for a large percentage of the small litters.

Recent aborters or diseased sows should not be bred until all evidence of disease has disappeared. All aborters or other diseased sows should be segregated and properly cared for to prevent the spread of the infection.

Value of Treatment

The important question from the breeders viewpoint is, shall the aborters and apparently sterile sows or boars be retained? An intelligent answer to the question involves a consideration of several factors. If a sow is a good individual then it is worth while to attempt to overcome the infection of the genital organs and prevent sterility. In attempting such treatment the sow should be isolated and the proper ration as previously indicated should be provided. The bacteriologic examination of the diseased genital organs and the discharges from the same has revealed a variety of microbes, the

occurrence of which is fairly constant. Many practitioners have reported favorably on the use of one or more injections of a combined bacterin made from the microbian invaders and it seems justifiable to recommend its use in conjunction with carefully applied douches of non-irritating solutions. It would probably be preferable to use sterile salt solution for douching. Douching is done most effectively by placing the sow in a crate and raising the front end sufficiently to obtain the advantage of drainage. The uterus should be well drained of all irritating fluids at the end of each treatment. The percentage of sterility, according to the reports from practitioners, in sows that have aborted and in which the above treatment has been carefully executed is very small and the expense of treatment is not prohibitive.

Treatment should not be recommended for aborting or sterile sows that are not good individuals. Such sows should be placed in the fattening pen and sent to market. The treatment of sterility in sows involves many different problems. In some cases this condition has been corrected, according to reports by providing a properly balanced ration and particularly the addition of mineral substitutes. This method of treatment will produce results only in those cases in which there is little or no alterations of the genital organs. The cases of sterility resulting from infection of the uterus may be overcome by the line of treatment suggested for genital infections succeeding abortion. Sterility resulting from cystic ovaries or similar conditions can be overcome, in some cases, in large sows, as follows: "The sow is placed in a crate and confined by tying in such a way that she can not move. After lubricating my arm with soap the hand is passed very carefully into the rectum. My hand and arm are small and I do not attempt to treat any animal that weighs less than 400 lbs. The wall of the intestine is very tender and is easily punctured and therefore care should be exercised in grasping the ovary. The left ovary is manipulated with the right hand and the right ovary with the left hand. The ovarian cysts are ruptured in the same manner as those of the cow. Cystic ovaries may also be treated by making an opening through the abdominal wall similar to the incision made for the flank method of the caesarean operation. This method of treatment is radical and it is doubtful if it should be advised, except in extreme cases.

Sterility in swine is an important problem and one in which the veterinarian can render the swine industry valuable service. From the available information it would appear to be more economical to prevent or treat aborters and sterile sows that are good individuals and have previously been good breeders than to depend upon gilts each year for pig production.

Copper sulphate in one-half to two per cent solution is destructive to snails. The use of 140 gallons of this solution per acre has been found to be quite an effective helicicide. Thus, it may be possible to control liver fluke infestation providing the cost for equipment, material and labor does not exceed the value of the snail infested land for pasture purposes.

The injury and losses of live stock due to iodin deficiency is appalling in some goiterous areas. It has been estimated that from 75 to 90 per cent of foals and 70 to 80 per cent of calves born in goiterous areas are affected with goitre at birth and that 95 per cent of the foals are still born or die within a few days. This malady has been so destructive to pigs in these districts that farmers practically discontinued swine breeding.

It has been demonstrated that goitre in angora goat kids can be prevented by the administration of potassium iodid per os to the doe during pregnancy or by the subcutaneous injection of tincture of iodin or the application of tincture of iodin upon the unbroken skin. The iodin treatment is equally effective in other animals.—Bul. 156 State of Washington.

YOUR DOG AND MINE*

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YOUR DOG REQUIRES MEAT

DOGS are purely carnivorous animals that is they are meat eaters. This is confirmed by the habits of his wild ancestors and of the domesticated dog when he runs wild; by the habits of his near relative, the wolf; and if further proof were needed, by the structure of his digestive organs and by his teeth.

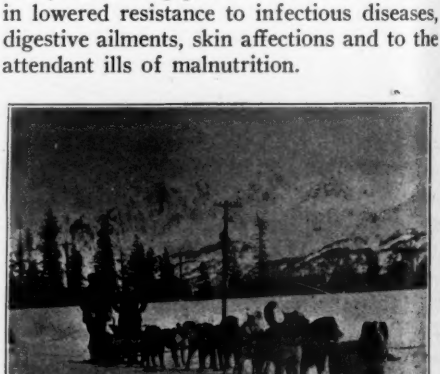
Six thousand years of domestication has done much for the dog mentally but has not changed him physiologically by an iota. Nature made him a flesh eater and a flesh eater he remains. Man cannot add a cubit to his own height nor has domestication added an inch to the length of the intestine of the dog, changed the shape of a single tooth or modified a single digestive ferment.

Because the dog is by nature a flesh eater, it does not follow that he cannot digest and assimilate food of vegetable origin and live and to some extent thrive upon it for considerable periods. Nature is not so unadaptable. But, no dog will have a disposition so likeable, a skin of as fine a texture, a coat as glossy, as much resistance to disease or as good health when deprived of food of animal origin as he would have if more wisely fed.

The young dog will not grow to maturity or live long without food of animal origin. Raw meat is best but milk, eggs, butter, cheese, fish and grease (gravy), even ice cream are substitutes that have kept thousands of dogs alive for months or years when their owners withheld meat through the very absurd fear that eating meat would cause worms or make the animals vicious.

Worms occur in dogs only because worm eggs have been swallowed. They can no more occur without eggs than wheat or corn or weeds can be grown without seed. Worm's eggs do not occur in meat, nor (except for tape worms which will be discussed at another time), is eating meat even remotely a cause of worms in a dog.

It is not necessary that a dog's entire diet be of meat. It is essential that he get some meat. Raw meat is preferable to cooked meat and liver is of less value than any other meat and not well borne for long periods. Meatless diets predispose young dogs to rickets, distemper and other ills. There is something in meat, perhaps a vitamin, possibly something else, that is necessary to the health and even the life of young dogs. To deprive them of all meat (and eggs and milk) for a long period is to court disaster in lowered resistance to infectious diseases, digestive ailments, skin affections and to the attendant ills of malnutrition.



The hardy dogs of the Northland work and thrive for weeks on a fish diet exclusively

* The three articles under this head are part of a series of fifty-two discussions written by the editor of VETERINARY MEDICINE and distributed by a newspaper syndicate organization to various daily newspapers for use in their Saturday editions each week. Although written exclusively for lay readers they are offered here, with permission of the syndicate, for such suggestions as they may contain, for the veterinarian who desires to instruct his clients in the care of their dogs, with a view to increasing the popularity of this animal among those whom he serves. Where some repetition is noted, it should be remembered that the articles were published separately at weekly intervals and it was necessary that each be in a measure complete.

DISCRIMINATION NECESSARY IN SELECTING FEED FOR YOUR DOG

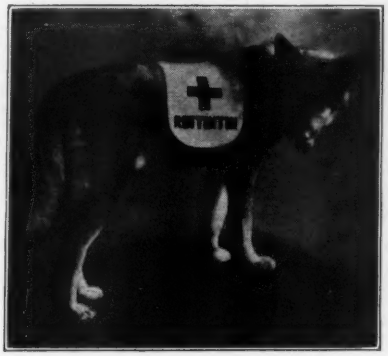
THE successful feeder of farm animals looks upon his animals essentially as factories. He supplies these factories with the raw materials of the farm, i.e., feed, and they turn out for him manufactured products, pork, beef, eggs, milk, wool, and in the case of the horse, available power. It is obvious that to operate his factories efficiently and turn out a good finished article he must supply the right kind of raw material for the purpose intended, which is different in the case of different animals and for the same animal at different ages. Conceivably, oats may be a very good raw product for a factory whose output is breakfast food, and cucumbers a proper material for a pickle factory, but in these cases, no sane superintendent would expect to operate his factory efficiently and turn out a good product if supplied only the raw material suitable for the other factory.

The owner who keeps a dog for a house pet or companion or simply because of his love of animals, does not regard it ordinarily as a factory, but he cannot get away from the general principles applying to the feeding of all animals, including man.

The owner of an immature dog is confronted with one problem; the owner of a mature dog with another. The principal article manufactured by the puppy from his feed is a dog. In the mature animal the output in the dog line is simply a maintenance of the product the puppy has fabricated; the remainder of his output, mental and physical, will not differ much in factory requirements from that of the puppy.

The puppy, then, for his output of the very complex article which he himself is to be, that is for the manufacture of a dog, will require in his raw material protein, fats, carbohydrates and minerals and, because he must grow, will require a plentiful supply of those mysterious elements, absolutely essential to growth, called vitamins. Because nature made him a carniverous or flesh-eating animal, and did not provide him with the elaborate digestive apparatus of the herbiverous or plant-eating animal, he must have these essential raw materials in simple, concentrated, easily assimiable form.

The vitamines, proteins, minerals and, to



less extent, the fats, he must get from foods of animal origin; that is, from meat, milk, fish and bones. These feeds serve him best in the raw state. Fortunately, in the cereals we have carbohydrates in a concentrated, easily digested form. A dog can digest these when cooked even though he is a carnivore. Boiled rice, corn pone, dog biscuits, table scraps, etc., are useful foods for a part, and a part only, of the dog's diet. The vitamins, proteins and minerals must be supplied from foods of animal origin. Carbohydrates (the cereals) alone are as inadequate in manufacturing a dog as aluminum alone would be in manufacturing an automobile.

The mature dog requires only about one-third the proportion of protein in his food that the puppy requires and an even smaller proportion of minerals and vitamins, with corresponding decrease in the importance, to him, of foods of animal origin. But he must not be wholly deprived of these or he is due for an early old age and a short and by no means untroubled existence. The ailments that follow a meatless diet are legion.

There is a very general prejudice against feeding meat, milk and fish to dogs, some thinking it favors worm infestation, others that such foods make animals ferocious. Both beliefs are delusions. A dog's diet must contain these foods in some form or he is due for much grief in the guise of physical infirmities.

FEEDING OF FIRST IMPORTANCE IN REARING PUPPIES

THIS discussion is limited to the feeding of puppies weaned at four or five weeks of age, for the precocious breeds, and at the age of six, seven or even eight weeks for the larger breeds. Usually such puppies are disposed of at the time of weaning or soon thereafter to some dog lover who hopes to raise it for a useful, intelligent, devoted friend and companion; a playmate for children or a solace for the childless.

If puppy was whelped on a farm where his mother had a large degree of liberty, she will have taught him to eat foods of her selection before she weaned him. If he was born in a kennel where dogs are reared for the market, his first owner will have taught him to eat cow's milk, meat broth, puppy biscuits and minced meat before he is entirely weaned.

And so he comes to his new owner, a roly-poly, soft little, fat little bunch of energy and happiness almost half as broad as he is long, with a tremendous appetite, a penchant for sleeping and an activity that knows no limit during waking hours. He is playful in the extreme, supremely happy and usually hungry. He wants to make friends with every person he sees, with the family cat, the parrot and any strange dogs that come within his ken.

Likeable as the puppy is, he has many enemies and formidable ones too. Being a baby animal, like being a baby human, is, compared with other occupations, exceedingly hazardous. However, since babyhood lasts at most but a few weeks in a dog and since the scheme of life for the puppy is less complicated than for a child, the puppy is more easily shielded from harm.

The more formidable of the puppy's enemies are to be found in the following four groups:

1, Nutritional ailments; 2, Infectious diseases; 3, Internal parasites; and 4, Accidents.

In proper feeding, we have an adequate defense against group Number 1. By proper feeding we also prepare the essential foundation for defense against the second and third groups by building up the puppy's natural resistance to these enemies, without which all other defense is likely to be futile and unavailing.

Cow's milk, preferably pasteurized, will constitute an important part in the regime for the first few weeks after weaning. It contains minerals, vitamines and possibly other substances imperatively needed by the growing puppy. It is well to give two feeds of milk daily. Presuming that the puppy is fed five times daily at this period, meat broth and hard dry bread soaked in the broth, should constitute two other feeds each day. No harm is done by allowing the puppy a small quantity of the cooked meat from which the broth was made. The fifth and ordinarily the last meal at night should be raw meat. Hamburger steak is convenient and satisfactory.

If the puppy is fed thus, he will not become hungry enough to eat more than is good for him. No harm will come from eating milk or broth until his abdomen is moderately distended, but the raw meat in the beginning should be given with discretion. He should not be allowed to stuff himself on any food as he will do if fed irregularly and allowed to become very hungry.

Bones to gnaw should be allowed him at all times. They may be either cooked or raw. At first allow only large bones that he can by no possibility swallow except as he gnaws away the soft ends. Bones not only afford the puppy a chance to exercise and develop his jaws and teeth but they supply much needed mineral matter and decrease the tendency to gnaw other hard substances to the injury of furniture and danger of swallowing indigestible matter.

Raw meat, uncooked milk and sunlight constitute a triumvirate that will unfailingly prevent rickets, the most serious and the most common of the nutritional ailments of young dogs. A teaspoonful of cod liver oil daily is in some measure a substitute for any of these and constitutes an additional safeguard against rickets and attendant ills.